FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP FEBRUARY 1, 1959

CLARK'S
CARAMEL
for COLOUR

A colour of natural origin permitted
in foodstuffs in all countries.

Clearly—
CLARK'S for CARAMEL

Brown & Polson Ltd
INDUSTRIAL PRODUCTS DIVISION
WELLINGTON HOUSE, 125/130 STRAND, LONDON, W.C.2.

B&P

This large bacon distributor also chooses

Colour printed METATHENE

POLYTHENE COATED CELLULOSE FILM

The Danish Bacon Co. Ltd. use colour printed Metathene pockets and MB vacuum drawing and pocket sealing machines for their new pack.

Metathene polythene coated cellulose film was chosen by the Danish Bacon Company because it is ideal for vacuum packaging. Its bond strength is exceptional—a vitally important point. Notice the strikingly bold use of colour. The smallest lettering is clear. All the print is safely locked in between the two films where it cannot get rubbed, and it is given a really eye-catching sheen. DBC have a good pack here!

Transparent, tough, flexible Metathene is used extensively too for vacuum packaging cheese, and also for the packaging of coffee, jam, vinegar pickles, and even hardware items such as tractor spares.

THE MB VACUUM DRAWING AND POCKET SEALING MACHINE

A single operator places filled ½ lb. bacon pockets on a belt and the machine draws the vacuum, seals, and ejects the sealed pockets automatically at speeds of up to 50 a minute. Ask for full details today.

MB **METAL BOX PLASTICS**

THE PLASTICS GROUP OF THE METAL BOX COMPANY LIMITED · 37 BAKER STREET · LONDON W.1 · HUNTER 5577

MB16/07

FOODTECH PROGRESS REPORT

1958 BROKE ALL RECORDS

1959 SHOULD BE EVEN BETTER

SALES OF both MSB and Foodtech machinery reached record peaks in 1958. Exports were doubled, orders being received from places as far afield as U.S.A., Australia, Pakistan and Ceylon, and home trade increased tremendously.

In 1958, the highlight of the year was perhaps Mr. Hilgeland's highly successful visit to Australia and the U.S.A.

The Following extracts from a letter, written by the Chairman of Australian Master Butchers Co. Ltd., Foodtech's Australian agents, speak for themselves.

"*. . . I would anticipate the immediate placing of orders for at least 20 Rotor Choppers, 30 KS Super Grinders, 12 Rohwer Filler-Linkers, as well as numerous other items; also tentative orders have been taken for a substantial tonnage of MSB.*"

"*I do say, on behalf not only of our company, a national organisation of the meat industry in itself, but for all Australians in our industry—'Thank you, and come again soon.'* "

In 1959, the highlight will undoubtedly be the important and revolutionary developments in Foodtech machinery, including two completely new Hilgeland machines.

Part of an enthusiastic 6-page article in the Australian 'Meat Industry Digest.'

THE FOODTECH EXECUTIVE TEAM

P. Helmut Hilgeland
Managing Director.

C. F. A. Fordham
General Manager.

Chas. Staples
Sales Manager.

Joseph Knight, A.M.I.Ex.
Import/Export Manager.

Michael Sullivan
Chief Engineer.

Peter Hilgeland
Demonstrator.

thank their customers very sincerely for their support in 1958 and wish everyone happiness and prosperity in 1959.

Foodtech Ltd.

QUEEN ANNE'S PLACE, BUSH HILL PARK, ENFIELD, MIDDLESEX. TEL: LABurnham 6656/7.

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The Series II Kent-Jones & Martin Flour Colour Grader

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1. A new optical system permits more accurate calibration, facilitates amp and cell replacement and ensures that all instruments will give equivalent results.
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3. Range modification enables the whitest flours to be graded.
4. Permanent built-in standards keep a constant check on performance.
5. Neater construction gives more attractive appearance and greater ease in cleaning.

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Induction Heating - 2

The broad principles involved in the use of induction heating for melting and processing metals have already been dealt with in this series (Data Sheet No. 2). In order to make a critical examination of its possibilities, however, the potential user should be aware of certain technical factors which must influence his decisions.

Induction heating, of course, demands the use of alternating current which is available from the public supply at a frequency of 50 cycles per second. Higher frequencies, however, are desirable for certain applications and can be obtained by means of the appropriate conversion equipment. Frequencies can therefore be considered in three categories:

Mains Frequency
(direct from mains)—50 c.p.s.

Medium Frequency
(machine generator)—50-10,000 c.p.s.

High Frequency
(electronic generator)—up to about 2,000,000 c.p.s.

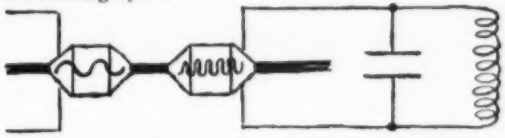
Mains Frequency

This needs no conversion equipment; it is particularly suitable for melting large pieces of scrap and, owing to the vigorous stirring forces produced, is excellent for alloy making. It has the merit of low initial cost compared with the high frequency method of melting, but is not so suitable for the production of high grade steel. Mains frequency induction heating is also useful for stress-relieving of welds in pipes and vessels, heating of chemical vessels, pipelines, injection moulding machines and press platens.

A typical example of the use of mains frequency is the coreless induction melting furnace which can be connected direct to the public 3-phase supply. Such a furnace rated at 120 kW, with a holding capacity of 2,240 lb., will give a throughput of 5,000 lb. per hour of hot cupola metal superheated from 1,350°C to 1,450°C.

Medium Frequency

Motor generators ranging from 10 kW to 1,500 kW or more at frequencies up to about 10,000 c.p.s. are widely used for heating for forging, melting from 100 lb. to 10 tons, hardening, annealing, etc. A bank of capacitors maintains a high power factor during the heating cycle.



Another form of generator for frequencies of 1 to 2 kc.p.s. and powers around 250 kW, useful for forge heating and melting high temperature aircraft alloys, is a 6-anode steel tank mercury arc inverter.

High Frequency

Metal hardening and metallurgical processing are best handled by high frequency induction (up to about 2,000,000 c.p.s.), particularly when a very thin case is required or when the section of the workpiece is too small to heat satisfactorily at medium frequency. These high frequencies are produced either by an electronic h.f. generator or a mercury-gap h.f. generator; high frequency induction can deal efficiently with such jobs as hardening lawnmower cylinders and cutters, bars and axle shafts.

The choice of frequency depends upon the metallurgical requirements and the size of the component to be treated. The following table gives the practical relationship between size and frequency, and may be used as a guide to the choice of generator, subject to metallurgical considerations.

Optimum Value

FREQUENCY C.P.S.	3,000	10,000	500,000	2,000,000
MIN. DEPTH OF HARDNESS POSSIBLE	.060 in.	.040 in.	.020 in.	.010 in.

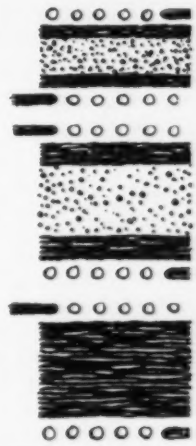
Practical Values

MIN. DEPTH HARDNESS EXPECTED	.150-.200 in.	.100-.150 in.	.030-.050 in.	.015-.030 in.
MIN. DIA. SURFACE HARDENING THIN CASE	2" & over	1" to 3"	½" to 2"	¼" to ½"
MIN. DIA. SURFACE HARDENING DEEP CASE	2" & over	2" & over	1" & over	not suitable
MIN. DIA. THROUGH HARDENING	1" & over	½" to 2"	¼" to ½"	not suitable

These are of course very approximate since they also depend on metallurgical considerations.

Power required for H.F. Induction Hardening

The high frequency power required per sq. in. of hardened surface depends upon the amount of metal behind the surface. Higher powers and shorter heating cycles are necessary for thin cases and when the thickness of metal behind the surface is small.



0.03" to 0.04" requires 1 sec. or less at 10 kW or more per sq. in.

0.1" to 0.2" with a large mass of metal behind the surface, requires 10-60 secs. at 2 kW per sq. in.

Through hardening requires 10-12 kWh per lb.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association. Excellent reference books (8/6, or 9/- post free) are available on electricity and productivity—"Induction & Dielectric Heating" is an example.

E.D.A. also have available on free loan a series of films on the industrial use of electricity. Ask for a catalogue.

Issued by the Electrical Development Association, 2 Savoy Hill, London, W.C.2 6818

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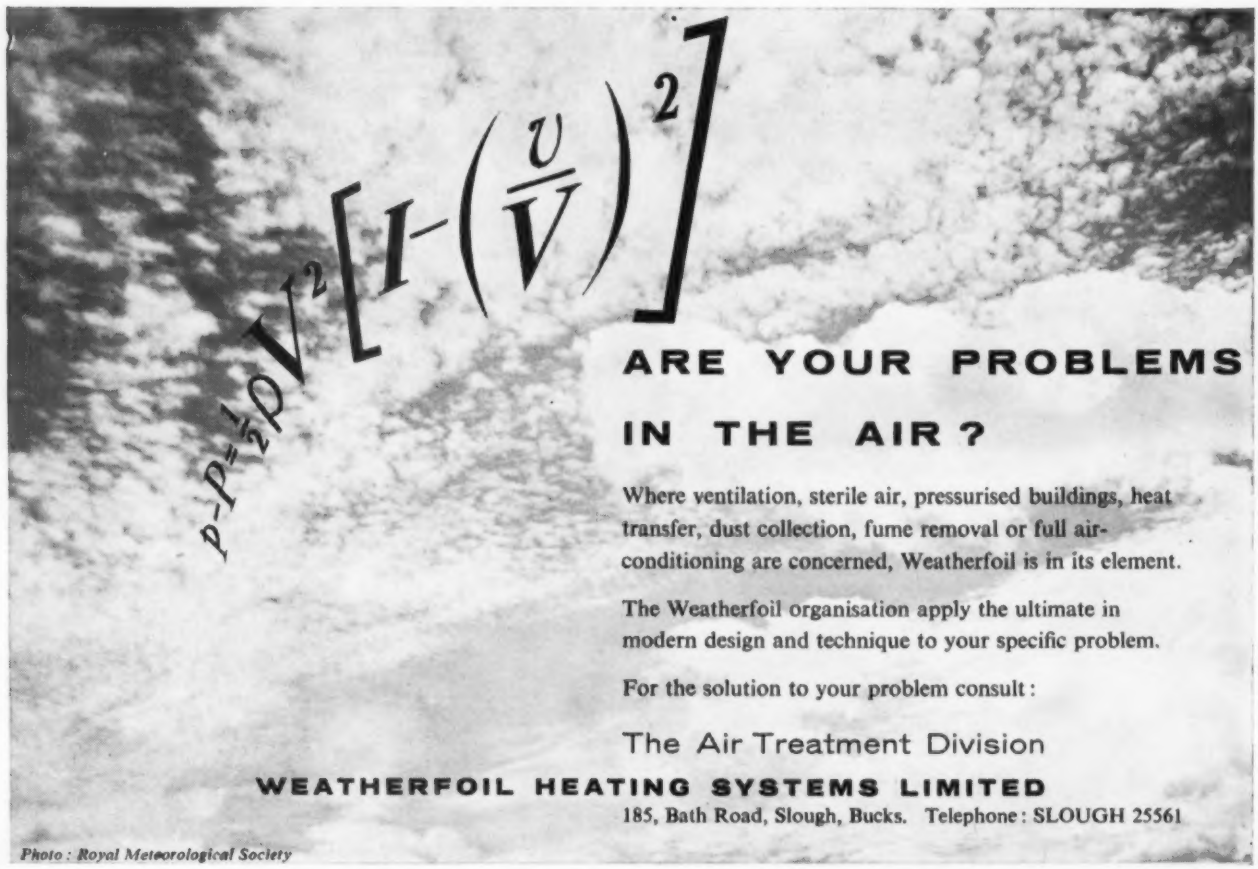
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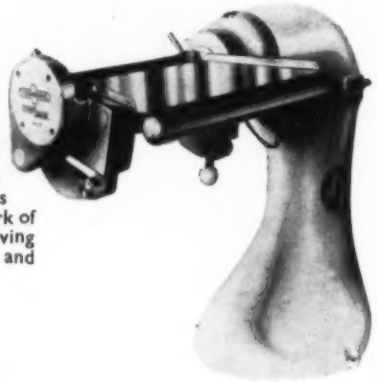

Townsend Derinder. Simple to operate and of uncomplicated design. Makes short swift work of any cut, removing rind smoothly and evenly.

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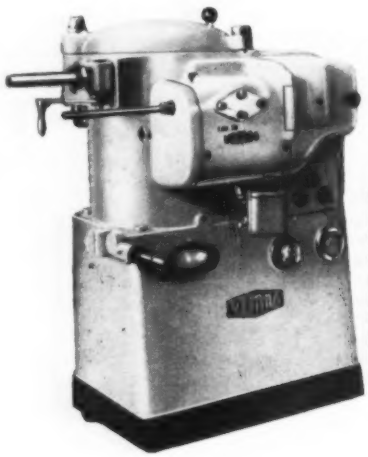
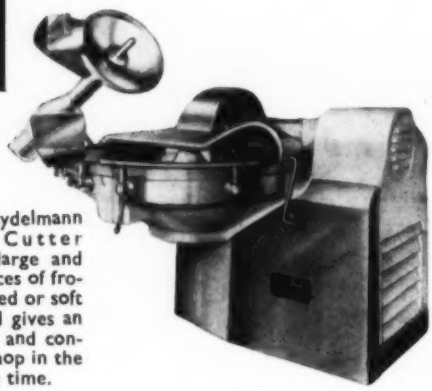


Vemag Filler and Linker. Operates with speed and astonishing accuracy for indefinite lengths of time. Output 2 to 16 identical links per lb. of any desired size.



The Seydelmann Super Cutter handles large and small pieces of frozen, chilled or soft meat and gives an excellent and consistent chop in the minimum time.

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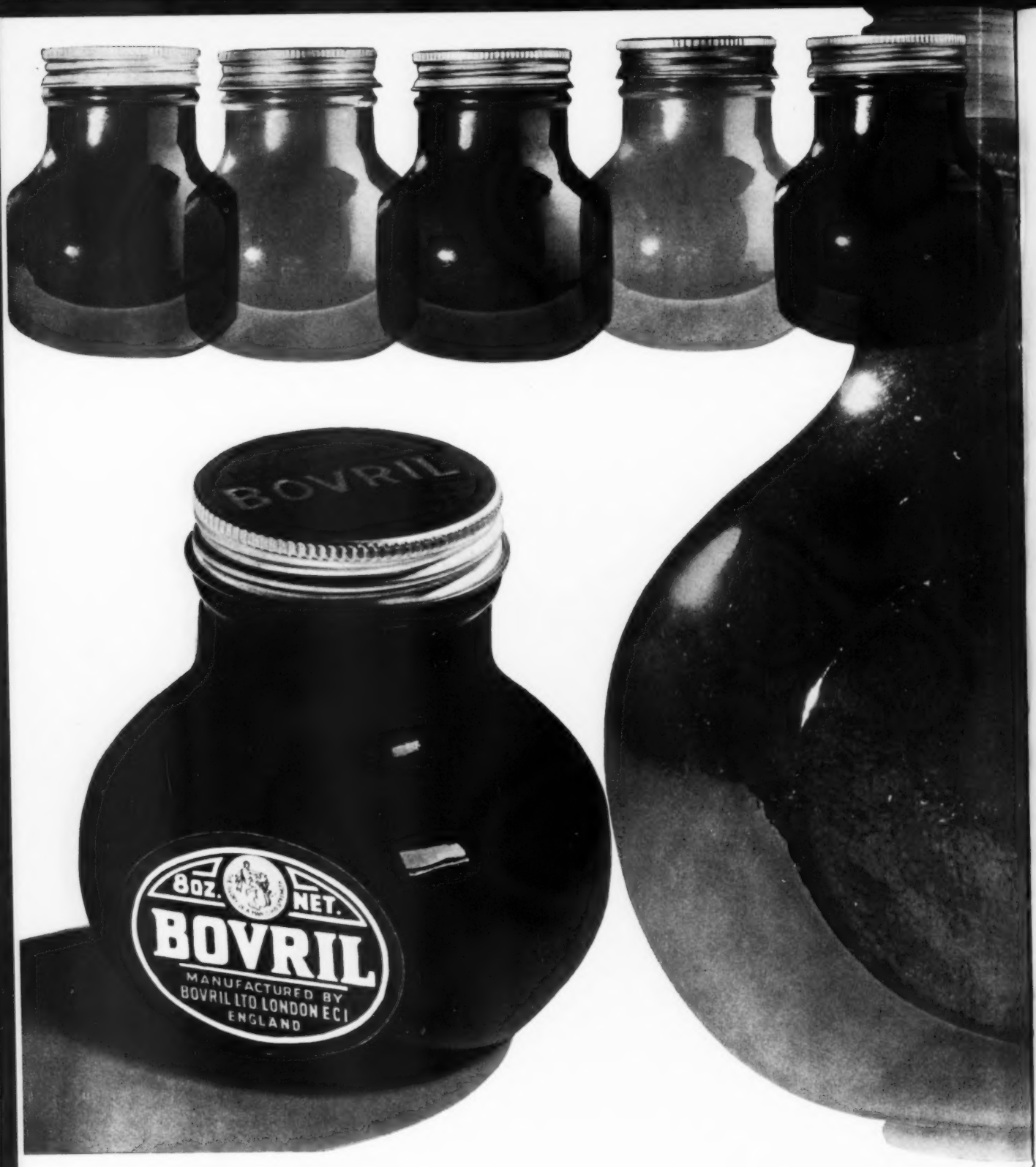

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- **Free** Service on Recipes.
- **Free** Service on Production Methods.
- Supplies of the Right Casing—Wienie-Pak 'Equilibrated'

Selling
- **Free** Service on Packaging.
- **Free** Service on Marketing and Selling.
- **Free** Point-of-Sale Material.

WRITE NOW FOR FULL TECHNICAL DETAILS OF THE WIENIE-PAK METHOD!

A typical pack of Harris's Quality Skinless Sausages.

OPPENHEIMER

W.P.I.

WIENIE-PAK SKINLESS SAUSAGE CASINGS

THE OPPENHEIMER CASING CO. (U.K.) LTD.
159/165 Harrow Road, London, W.2. Telephone: PADdington 7431/7.

EDINBURGH, Fountainbridge 1403-4. BELFAST, Carryduff 274. DUBLIN, Dublin 889208

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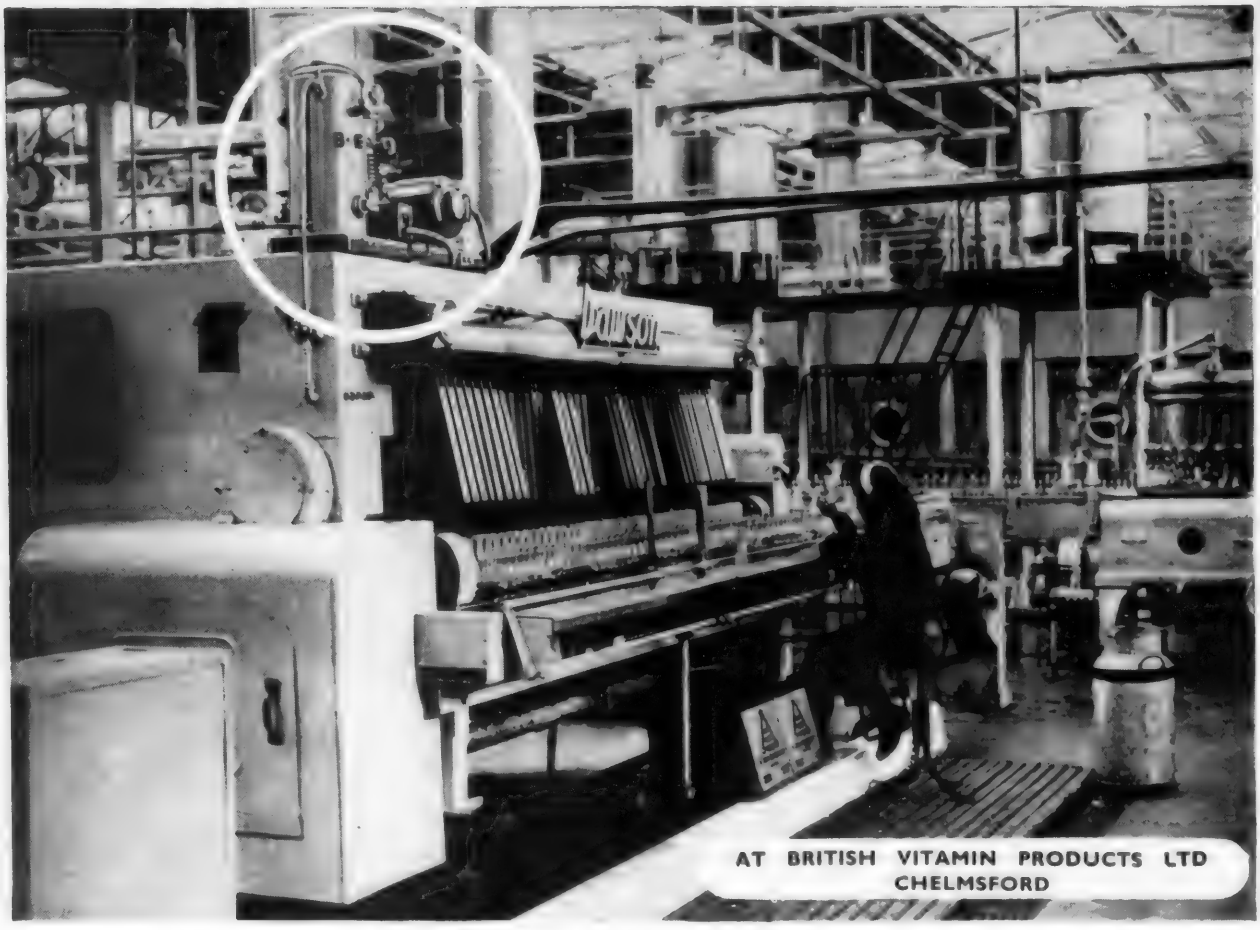


AT BRITISH VITAMIN PRODUCTS LTD
CHELMSFORD

Serving Industry

Many famous names in the British Food Manufacturing Industry select B.E.N. Air Compressors and pneumatic equipment to serve them in the manufacture of their products . . . and the reason? . . . their reputation for reliability and sound performance backed by an efficient after-sales service.

Typical of the many B.E.N. Air Compressors installed in industrial plant throughout this country and overseas are those of British Vitamin Products Ltd., manufacturers of the world-famous BRITVIC fruit juices.

These compressors provide air for operating clutch, pump and control mechanisms on their Hydro Bottle Washing Units. Our illustration shows one of these impressive machines on which is mounted a B.E.N. Model VR3A Automatic Unit.

For over 30 years the B.E.N. organisation has been serving industry with compressed air equipment and this long experience is available to all without obligation.

COMPRESSED AIR ENGINEERS

B.E.N. PATENTS LTD. (Division of Broom & Wade Ltd.)
Dept. F.3. HIGH WYCOMBE, BUCKS.

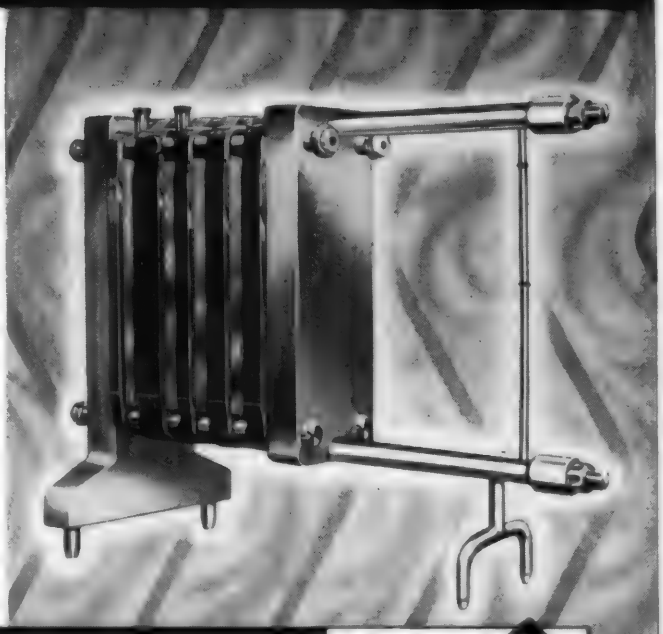
C.P 323
A12

PLATE HEAT EXCHANGERS

DE LAVAL Heat Exchangers
offer the most efficient method of Heating, Cooling and Pasteurising in the Food, Chemical and Process Industries.

Their applications are unlimited and units have recently been sold for:

ANIMAL FATS	PERCHLORETHYLENE
BEER	PROTEIN LIQUORS
BUTANE	SOLUBLE OILS
CAUSTIC LIQUORS	STARCH LIQUORS
COFFEE EXTRACTS	SYRUPS
FRUIT JUICES	TURBINE OILS
GELATINE	VEGETABLE OILS
MINERAL WATERS	VINEGAR
MOLASSES	WHEY
PENICILLIN MEDIA	WOOLGREASE, Etc.



DE LAVAL OF COURSE !

De Laval Type P.14 RB Heat Exchanger—Stainless Clad

P.141 VB Industrial Model

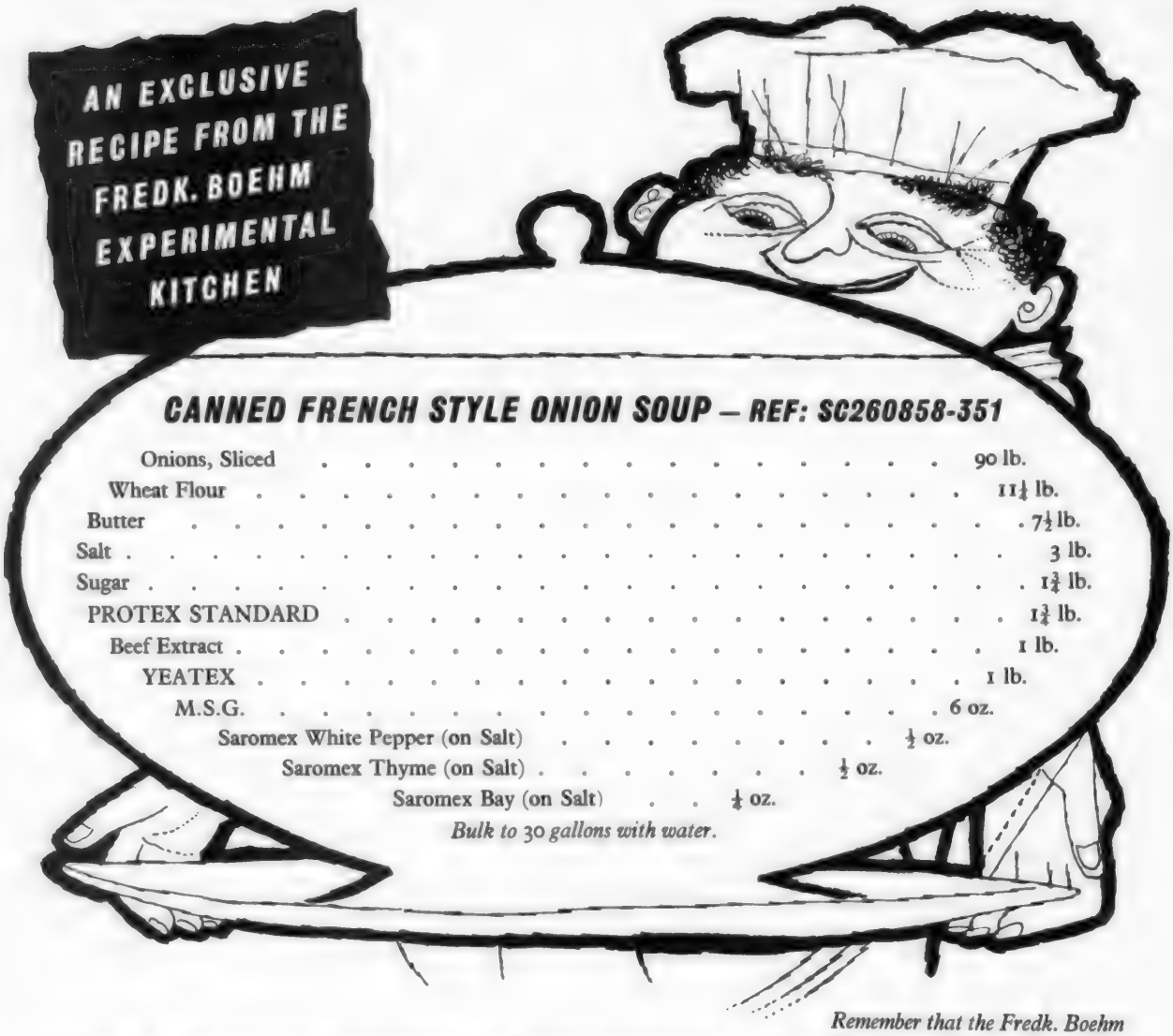
10 *reasons why you should also choose De Laval:*

1. Unsurpassed for heat transmission.
2. All stainless steel contact.
3. Accessibility of all liquid surfaces for inspection and easy cleaning.
4. Multi-stage operation can be arranged on one unit.
5. Easy extension or modification to suit changed working conditions.
6. Small volume of liquid hold up.
7. No risk of liquids mixing.
8. Small space requirements.
9. Fine limits of temperature control.
10. Several liquids can be treated simultaneously in the same unit.

CONSULT DE LAVAL on your heat exchange problems . . . and all processes involving Centrifugal Separation

Process Engineering Division
ALFA-LAVAL COMPANY LIMITED · [illegible] WEST ROAD · BRENTFORD · MIDDLESEX · Tel: EALing 0116

Smee's DL410



CANNED FRENCH STYLE ONION SOUP — REF: SC260858-351

Onions, Sliced	90 lb.
Wheat Flour	11¼ lb.
Butter	7½ lb.
Salt	3 lb.
Sugar	1¾ lb.
PROTEX STANDARD	1¾ lb.
Beef Extract	1 lb.
YEATEX	1 lb.
M.S.G.	6 oz.
Saromex White Pepper (on Salt)	½ oz.
Saromex Thyme (on Salt)	½ oz.
Saromex Bay (on Salt)	¼ oz.

Bulk to 30 gallons with water.

Cook the sliced onions in the butter in a boiling pan until they are golden brown in colour. Whisk the other ingredients with water to form a smooth paste and add this to the onions. Bulk to 30 gallons with water, bring to the boil and simmer for 5 minutes. Fill hot into plain No. 1 Tall cans, seal and process for 1¼ hours at 240°F. Water cool.

Remember that the Fredk. Boehm Experimental Kitchen exists to help you. Perhaps you have a recipe of your own which is proving to be a problem; or perhaps you want a recipe prepared for you by experts. That is where our unrivalled experience can help you. Write to us at the address below. The service by the way is FREE.

Fredk. Boehm Ltd.

FREDK. BOEHM LTD., 19 BENTINCK STREET, W.1.
TELEPHONE: WELbeck 7933

SOLE SELLING AGENT FOR M.S.G. IN SCOTLAND IS J. R. DALZIEL (CASINGS) LTD., 11 LAMBERT STREET, GLASGOW, S.E.

PIONEER FBL LTD London BRAND

Suppliers of

PROTEX
(Hydrolised Protein)

YEATEX
(Autolysed Yeast Extract)

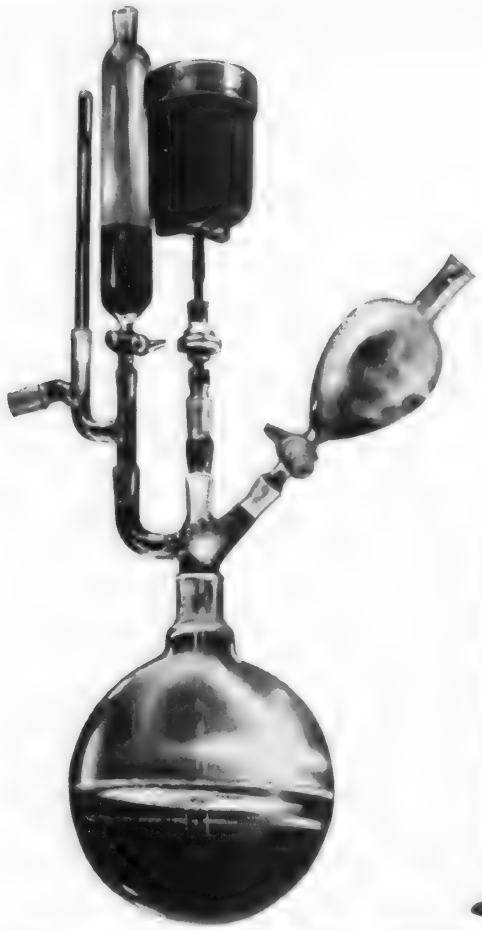
AJINOMOTO
(Monosodium Glutamate, 99% Pure)

Paints by The Dentolite Process — FUNGI-CHEK Gloss, FUNGI-CHEK Matt and FUNGI-CHEK Emulsion Paint — are finest quality decorative finishes with excellent durability, resistance to steam, abrasion, acids and alkalis, AND made continuously fungicidal and bactericidal by a unique reaction The Dentolite Process (World Patents applied for). This reaction occurs during the drying of the film and lasts throughout its entire life. Thus for many years (tests after five years still show bactericidal activity), the coatings inhibit the growth of Mould, Fungi, Wild Yeasts and Bacteria—patheogenic or otherwise. As FUNGI-CHEK is free from any toxic compounds of lead, arsenic, copper, mercury, tin or any harmful or poisonous chemicals, it must now be considered the ideal paint and the obvious choice for decorative and/or functional painting wherever food is manufactured, stored or processed.

DENTON EDWARDS PAINTS LIMITED

Manufacturers of Fine Paint for over 160 years

ABBEY ROAD, BARKING, ESSEX. Rippleway 3871 (10 lines)



when your product begins as a formula...

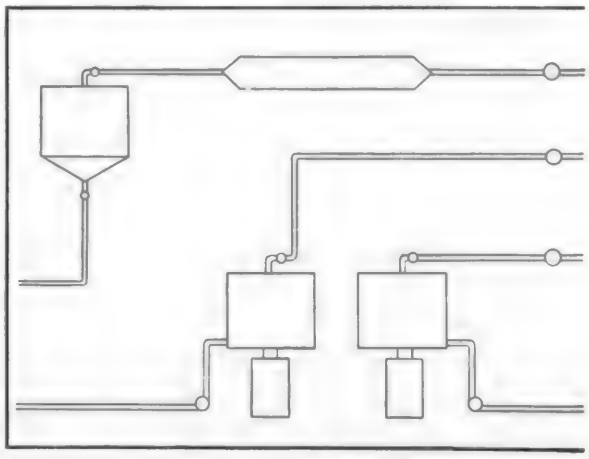
PRODUCTIVITY CALLS

FIRST YOUR FORMULA. It was born in your laboratory out of hard thinking, patient work and hopeful spending. Now it is ready to be turned into productivity and profits. Now speed comes into the picture; speed and volume. It's going to be thousands of gallons now, not pipettes full. Yet it has all got to be as precise in the factory as it was in the laboratory. Clearly a matter of measured batch dispensing and blending; a problem of process control.

THE AGE OF AUTOMATION

This was the picture we at Measurement had in our mind's eye when we were working on the Measurement *Automatic* Liquid Process Control system. Industry, we knew, would want accuracy and speed, and a modern way of applying it. An up-to-the-minute way. In this modern age the bucket is out, mainly because it excludes accuracy. Lifting and trucking must be eliminated because firstly it results in hold-ups, secondly in a waste of labour, and thirdly fatigue with its resulting fall-off in rate of production. Our equipment aims at automatically dispensing the right quantity to the right place at the right time, with all the necessary indication and records made automatically en route. The age of automation inspires sound business men to ask for the right installation for the job and no making shift. Control is the keyword.

"Backed by our years of experience", as the advertisements say (for we have been making liquid meters, pumps and electrical control apparatus for a very long time), we set about meeting this challenge. Years of research finally produced



the instrumentation that offered the flexibility which is essential, and the standardisation which makes the system an economic proposition for industry.

A FLEXIBLE SYSTEM

Today Measurement equipment is used in handling a large number of liquids in food manufacture, paper making, oil blending and chemical mixing processes. Liquids handled range from condensed milk to caustic liquors, and from benzine to beef dripping, and at Measurement Limited there is a catch phrase, " If it flows in a pipeline, then we can meter it".

ADVISORY SERVICE

We offer advice, designs and drawings to cover any complete liquid handling installation to suit any process—*your* own particular process. Given dimensional details, components can be supplied to be fitted into existing panels; otherwise we would supply complete wall-mounted or bench-mounted panels, or console models, tested and ready for installation. Servicing is a thing we regard as a duty at Measurement.

PUNCHED CARD SYSTEM

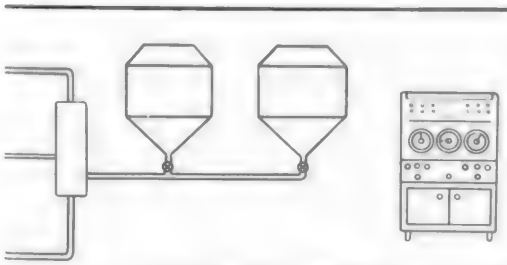
Not only does the Measurement system make Liquid Process Control merely a matter of pressing buttons, now batch delivery and blending can be completely preset and controlled by the punched card system!

SCRIBBANS-KEMP (BAKERIES) LIMITED
Control panel for automatic blending of liquids used in biscuit manufacture at the factory of Scribbans-Kemp (Bakeries) Limited, Grimsby.

FOR MEASUREMENT LIMITED

A WIDE RANGE OF INSTRUMENTS

Whenever a liquid has to be handled, Measurement Limited make equipment to do the job, from indicating a total consumption of a liquid to the automatic dispensing, blending and mixing of various liquids.



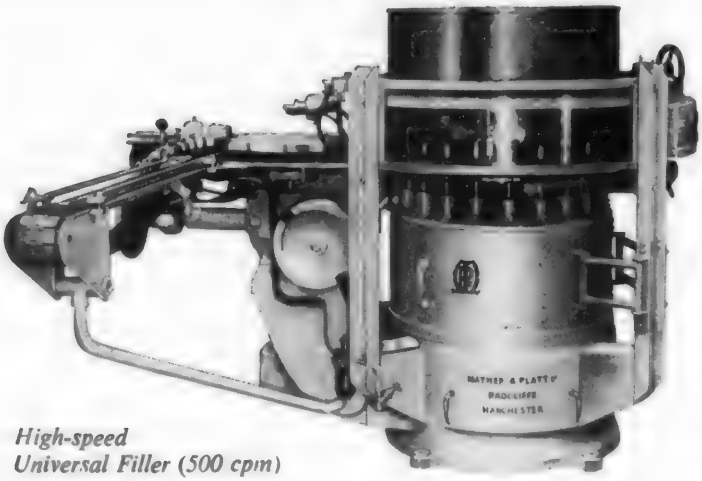
Automatic dispensing of liquid from alternative storage tanks to a blending tank and to two rotary mixing machines. The three meters are denoted thus—○, and the three indicators are remotely mounted in a control panel with signal lamps to confirm operation of meters, valves and pumps.

The range of products include:—

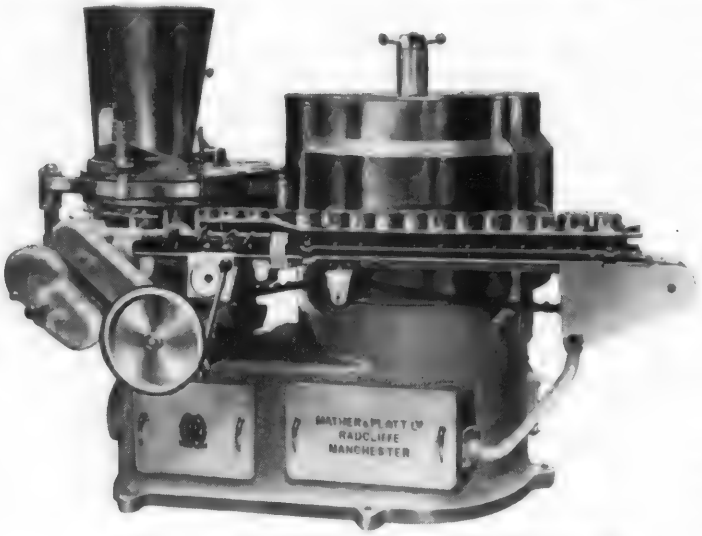
(a) Meters made in various metals and moulded materials to enable almost any particle-free liquid to be metered.
(b) Meters with small pointer type indices.
(c) Meters with small direct reading counters.
(d) Meters with resettable direct reading numeral rollers.
(e) Meters with remote reading magnetic counters.
(f) Meters with horizontal or vertical large dial instruments having resettable pointers.
(g) Meters with automatic presettable indicators that enable the operation of valves, pumps and warning devices.
(h) Complete panels with auto preset indicators, signal lamps and push buttons for wall mounting or free standing.
(i) Schemes involving a number of meters dispensing liquids to one outlet.
(j) Schemes where a number of liquids are dispensed through one meter.
(k) Automatic actuation of metering equipment by photo-electric cell or contact operating devices.
(l) Complete panels incorporating mimic diagrams.
(m) Complete auto preset equipment that could be preset by a punched card reader unit.

★ *You may be tempted to tear out this advertisement for reference. Well, it's always a pity to spoil a book: get your Secretary to drop us a card and we'll gladly send you a reprint of these pages. A letter with more detailed requests will, of course, receive more detailed attention. Write to:—*

MEASUREMENT LIMITED
TAMESIDE WORKS DOBCROSS, NR. OLDHAM, LANCS.
Telephone: Delph 424 (5 lines) *Telegrams:* Supermeter Dobcross
MEASUREMENT ENGINEERING LIMITED P.O. Box 2305, Wellington C.I.
PARKINSON COWAN (S.A.) (Pty.) Ltd. P.O. Box 1113, Johannesburg
Export Enquiries to: Parkinson Cowan Group Exports Ltd., Terminal House, Grosvenor Gardens, London S.W.1.
Telephone: SLOANE 0111/4 *Cables:* DISC London



High-speed Universal Filler (500 cpm)



High-speed Solid and Liquid Filler (300 cpm)

A10 Can Filler (30 cpm)

MODERN FILLING MACHINERY

These modern machines are part of a new and complete range of designs by Mather & Platt Ltd for the canning industry.
They combine a high degree of accuracy with high speed and simple and economical maintenance.

Mather & Platt
LIMITED

RADCLIFFE
MANCHESTER

606

TRU-SIL

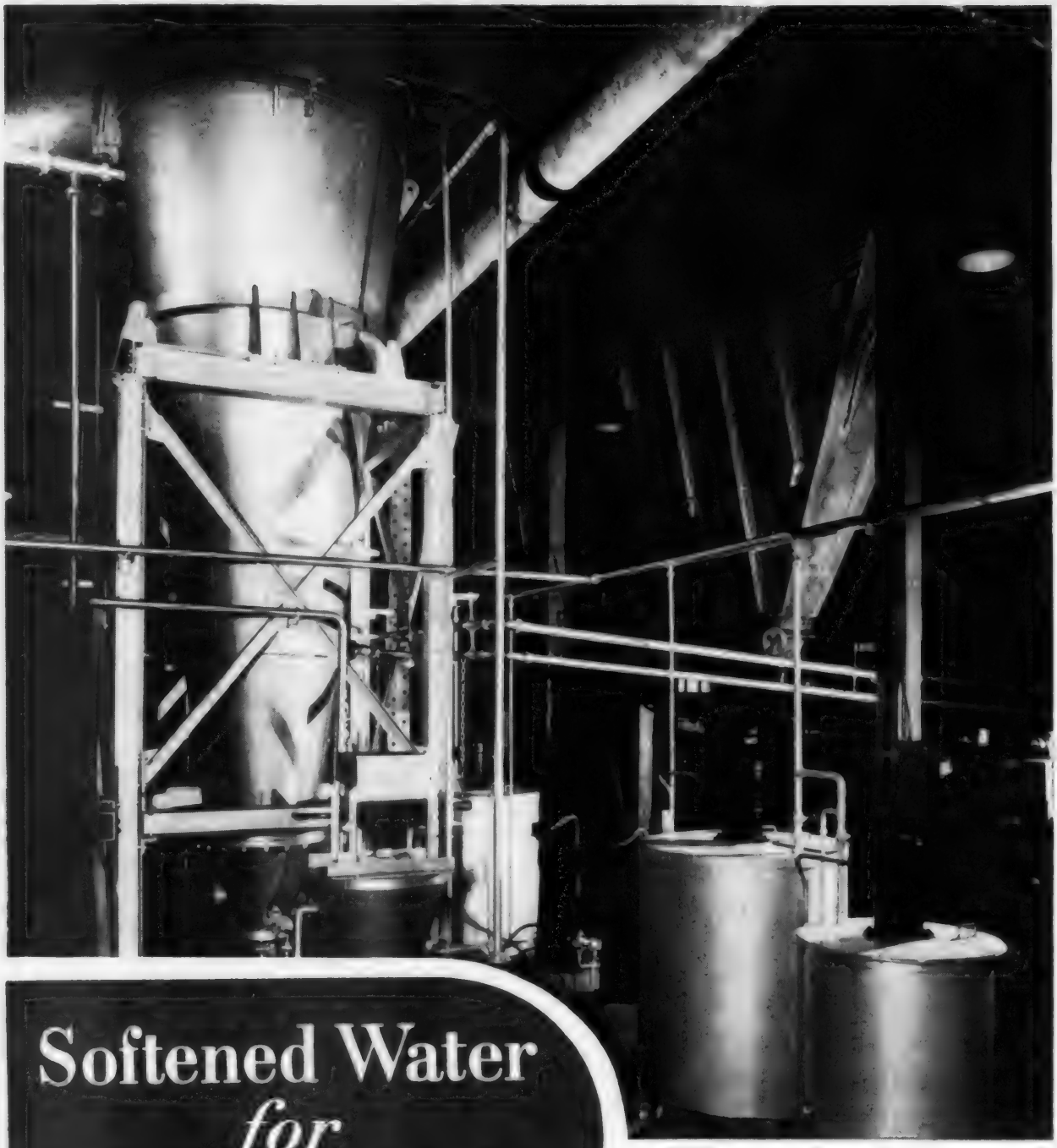
Locked-in

POWDER FLAVOURS

BUSH

A selection from our extensive range of "Locked-in" Powder Flavours. Insist on "Tru-Sil".

W. J. BUSH & CO. LTD. LONDON · E 8 · ENGLAND *Clissold 1234*



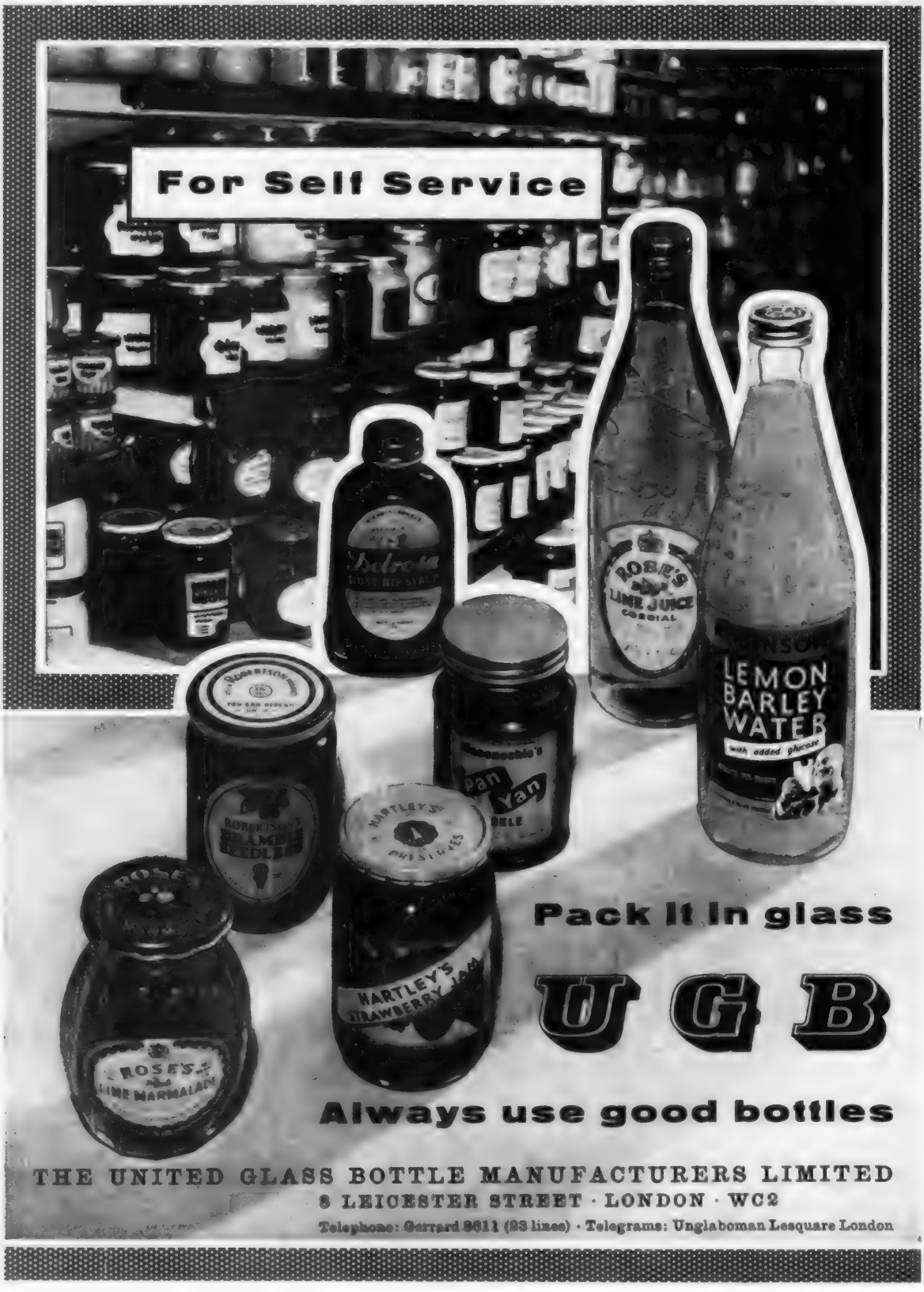
Softened Water *for* BOILER FEED by PERMUTIT

Consistent zero-hard softened water for boiler feed is supplied by "Spiractor" cold lime softener followed by a Permutit Ion Exchange softener. This is only one of a range of Permutit plant designed to supply correctly treated boiler feed. If you require further information on Permutit boiler feed water treatment plant, please write to:—

The PERMUTIT COMPANY LTD. Dept. W.L. 272, Permutit House, Gunnersbury Avenue, London, W.4

Telephone: CHIswick 6431

When you launch
your product on the seas of trade,
show its colour and quality from the security of a
Key glass container. Containers and closures
specially designed by Key Glassworks Ltd are the vessels
in which your wares will voyage safely and successfully.
Key Glassworks Ltd Factories at New Cross Alperton Harlow
First Class in U.K.&E.
Please address all correspondence to Ronald Gale and Co Ltd 7 Fursecroft George Street London W1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ROSE'S LIME JUICE CORDIAL
LEMON BARLEY WATER
with added glucose
Pan Yan
HARTLEY'S STRAWBERRY JAM
ROSE'S LIME MARMALADE
Pack it in glass
U G B
Always use good bottles
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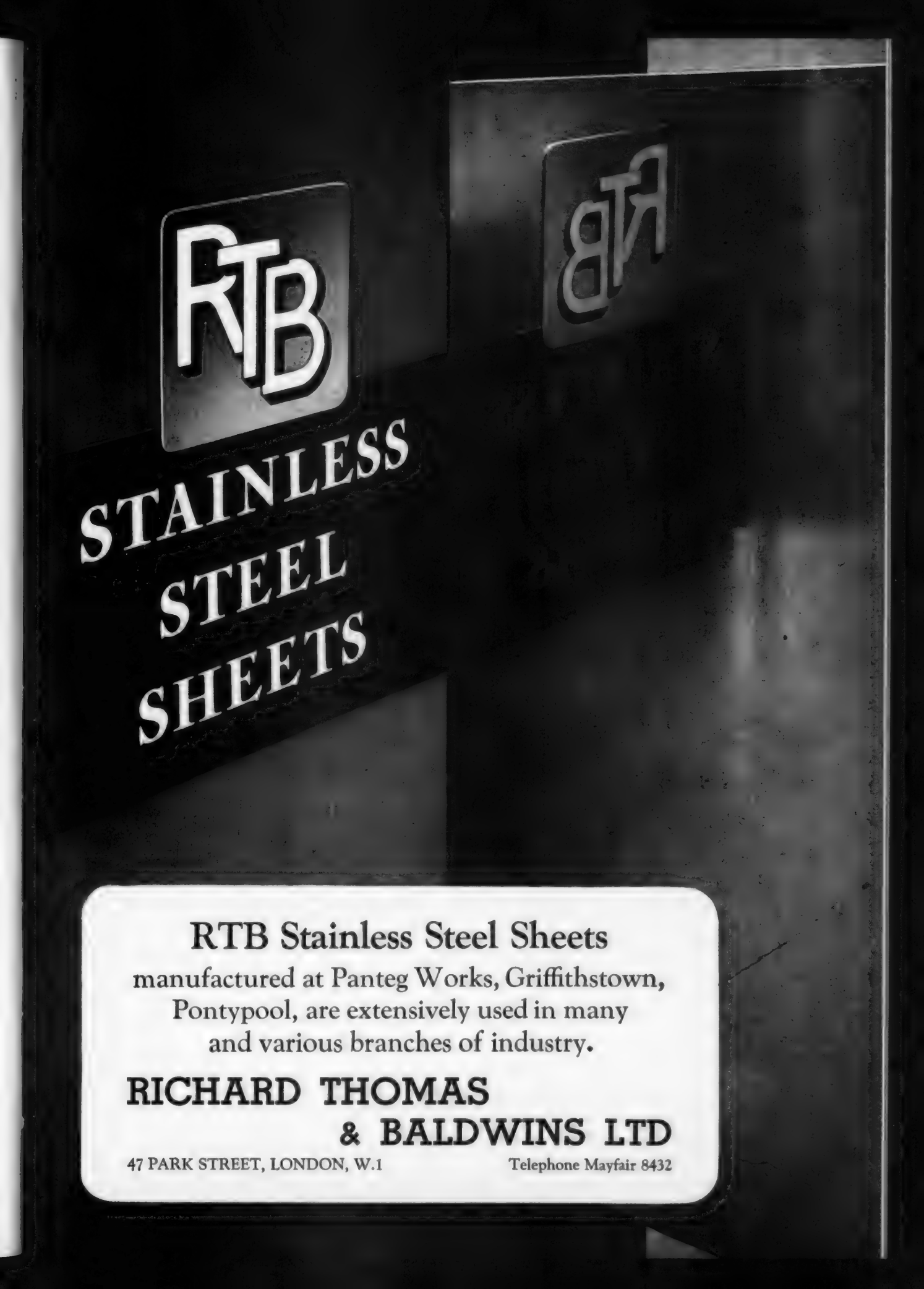

RTB Stainless Steel Sheets

manufactured at Panteg Works, Griffithstown, Pontypool, are extensively used in many and various branches of industry.

RICHARD THOMAS & BALDWINS LTD

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A
VENESTA
PRODUCT
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foil
Consistently Good

For SPECIAL SALES APPEAL in 1959

"Derby" ½ *lb. size* $3\frac{7}{8}$" *dia.* × $5\frac{1}{16}$"
1 *lb.* „ $4\frac{13}{16}$" „ × $5\frac{3}{4}$"

Decorated Stock Boxes by Metal Box

An attractive container for almost every bakery or confectionery product, also for tea, can be found among the wide range of stock boxes produced by Metal Box.

Manufactured in many sizes, shapes and designs and strikingly colour printed under a hard gloss varnish, Metal Box stock boxes appeal tremendously to the customer and will bring you increased sales and goodwill.

* IMMEDIATE DELIVERY FROM STOCK! *

QUANTITIES FROM 10 DOZEN UPWARDS!

You can order as few as 10 dozen in a single design or size of Metal Box stock boxes or, of course, any larger quantity you like. Long production runs mean very reasonable prices too. Stock boxes are proven sales makers in normal distribution and can also be used for carrying out special trial schemes.

Send today for full list and prices.

"Suyin"
$5\frac{1}{2}$" *dia.* × $2\frac{7}{16}$"

METAL BOX

THE METAL BOX COMPANY LIMITED · 37 BAKER STREET · LONDON W.1 · HUNTER 5577

Processed Food Cans · Metal Containers · Paper Products · Plastic Packages and Laminations

MB31.27

AND NOW *Caxton on tap!*

We don't merely advocate progress—we promote it! Here as proof is our new road tanker, designed specifically to pipe liquid chocolate straight into your plant. The labour-saving advantages are obvious. The carrying and breaking of blocks, and the melting procedure are eliminated. Staff at present employed in these departments can be usefully transferred elsewhere . . . space saved can be used to provide increased production facilities In short, a continuous line flow process is a "must" for every manufacturer who believes in automation and parallel developments.

Our Technical Advisory Service will be pleased to assist you with plans, advice and demonstrations so that you may profit from the advantages of liquid bulk delivery at the earliest possible opportunity. Why not get in touch with us, immediately?

CONSULT

Caxton

FOR CHOCOLATE COUVERTURE AND TECHNICAL ADVICE

CAXTON CHOCOLATE COMPANY LIMITED · LONDON · N.22

ANNOUNCEMENT...

Announcement is made that Van Ameringen-Haebler, Inc. of New York, and Polak & Schwarz N.V. of Zaandam, Holland, have combined their interests and will operate as divisions of a new company, to be known as

INTERNATIONAL FLAVORS & FRAGRANCES INC.

The identities of these two long-established firms will be retained and each will continue to serve its customers in the same manner as in the past.

By operating in conjunction with each other, they will have development, manufacturing and distributional facilities in fifteen countries, through wholly-owned subsidiaries in North and South America, Europe, Indonesia and South Africa.

As a result both firms will be able to supply their products and services on a greatly expanded and more effective basis.

VAN AMERINGEN-HAEBLER
Division of International Flavors & Fragrances Inc. 521 West 57th St., New York 19. N.Y.

POLAK & SCHWARZ INTERNATIONAL N.V.
Division of International Flavors and Fragrances Inc. Zaandam – Holland.

Creators and Manufacturers of Flavours, Fragrances and Aromatic Chemicals.

POLAK & SCHWARZ (ENGLAND), LIMITED,
50 Great Cambridge Road, Enfield, Middlesex. *Telephone: ENFIELD 6781/2/3/4.*

NOW
a
fibreboard
case
from Reed
for the
food industry
Reedac
SOLID
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solid for foodstuffs

the case for strength with economy

Whatever fine fare *you* produce—you'd be better off putting it into REEDAC SOLID cases. Here's the way it works!

On your 'go-ahead', Reed Laboratory and Design departments will make a special study of your product and its protection . . . and then construct a specific REEDAC case which will be absolutely *right* for the job, at the most economic cost. This service is free of charge—and you are invited to submit your products for samples and quotation without obligation.

Reedac

"gilt-edged" delivery service

Reed have matched the quality and reliability of their REEDAC cases with an equally reliable delivery service. Swift and certain, the REEDAC "GILT-EDGED" DELIVERY SERVICE ensures that your cases arrive on time, in the quantity you require. Rapid, reliable, regular and unrivalled in its scope and size, this is the REEDAC "GILT-EDGED" DELIVERY SERVICE!

Your regular copy of "CASE"

May we send you a copy of the lively and well-illustrated R.C.C. Magazine "CASE" regularly? It contains advance news of the latest developments at Reeds, together with many informative features on modern packaging techniques.

Please send me "Case" regularly.

Name .....

Company .....

Address .....

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(PLEASE WRITE IN BLOCK CAPITALS)

3/C1

Reed now produce both solid and corrugated cases

REED CORRUGATED CASES LIMITED

GREAT WEST ROAD · BRENTFORD · MIDDLESEX

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RCC3

Really safe paints . . .

Bottle Washing Machine treated with Evokote Type 21 at the Streatham, London, factory of Messrs. United Dairies Ltd.

for the Food Industry

✳ *Proof against mineral and organic acids, gases, steam, caustic soda, detergents, abrasion.*

EVOKOTE

EPIKOTE RESIN BASED PAINTS

✳ *Combined maximum chemical and corrosion resistance, with hardness, adhesion and flexibility.*

A PRODUCT OF EVODE OF STAFFORD

Manufacturers of BITUGEL, EVODYNE and EVO-LED paints

✳ **SEND FOR LITERATURE** *EVODE LTD., (PAINTS DIVISION)* **STAFFORD.** *Telephone: 2241*

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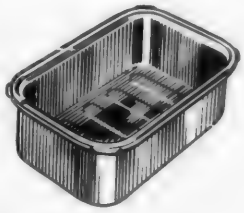
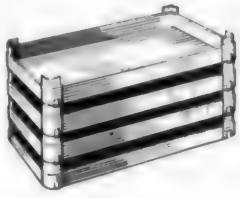
M-W 86

HYGIENE puts YOU on OUR metal!

ALUMINIUM Stacking Containers





Range **C S. 24157 — 23½″ x 14¼″ x 7¾″**
C S. 24155 — 23½″ x 14¼″ x 5½″
C S. 24153 — 23½″ x 14¼″ x 3½″

Now produced from specially treated aluminium alloy to give increased strength to the base. Increased demand enables us to make this improvement without uplifting the selling price.

- ★ Absolutely hygienic and easy to clean
- ★ Exceptionally strong rim obviating handles
- ★ Positive stacking by extra deep swage
- ★ Available with or without base drainage holes
- ★ Larger sizes in 16 gauge, smaller size 18 gauge Aluminium Alloy
- ★ Lids also available, common to all sizes
- ★ All sizes will interstack

WARWICK 'WARCO' Reg Trade Mark ENGLAND
First Choice for Aluminium Equipment

Enquiries for all your Aluminium Equipment welcomed by

WARWICK PRODUCTION COMPANY LTD

A MEMBER OF THE ALMIN GROUP

BIRMINGHAM ROAD, WARWICK **Telephone: WARWICK 693-696**

QUALITY in White Flint GLASS CONTAINERS

First Class in **GLASS**

NATIONAL GLASS WORKS (YORK) LTD.

FISHERGATE, YORK. Tel. YORK 23021
ALSO AT 105 HATTON GARDEN, LONDON, E.C.1
Tel. HOLBORN 2146

★ Packed in easily handled cartons

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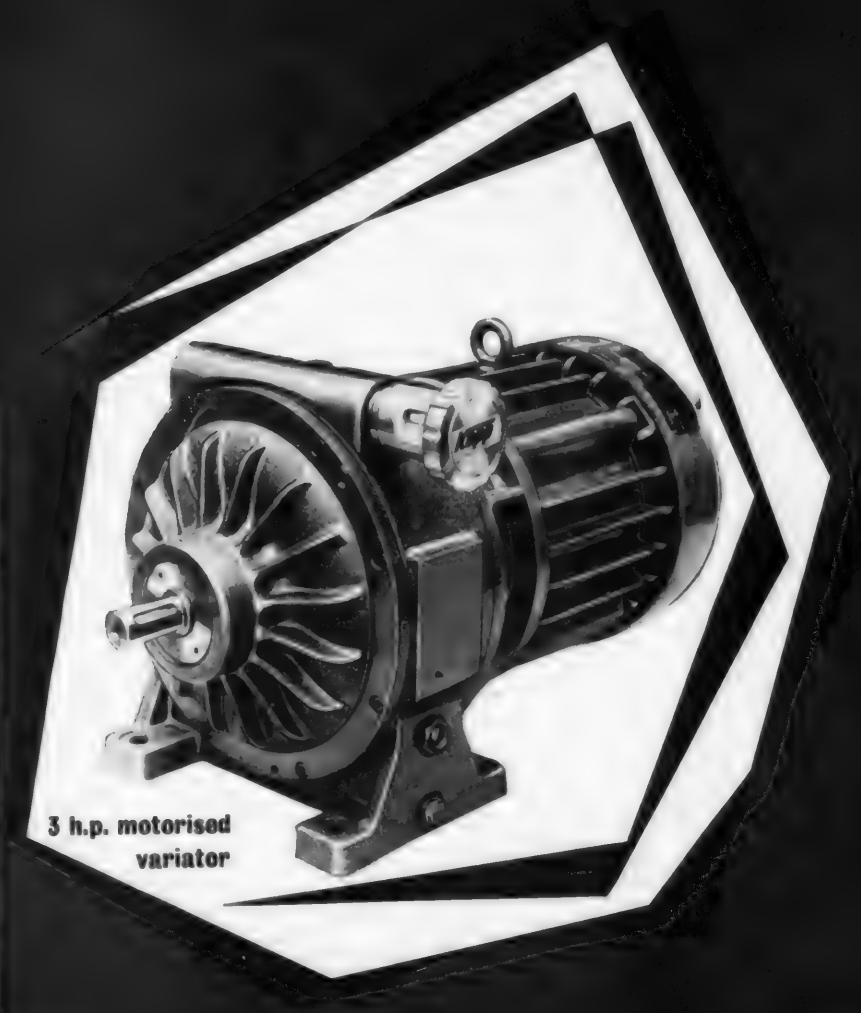
TRADE N MARK



3 h.p. motorised variator

Stepless speed variation over a 9 to 1 output speed range (1/3 to 3 times the input speed).

Constant horse-power transmitted throughout the speed range.

Flange mounted motors (when required) giving output speeds from 320 to 2880 r.p.m. and from 480 to 4320 r.p.m.

Output speeds down to 3 to 27 r.p.m. or lower can be obtained with flange mounted Reduction Gears.

Exceptionally light, sensitive and accurate control of speed settings by lever or handwheel with counter type indicator incorporated if required.

Kopp

VARIABLE SPEED GEARS

Co-axial input and output shafts which rotate in the same direction.

Service reliability resulting from a simple design manufactured to high precision limits.

Compactness, with consequent ease of mounting as an integral part of a machine.

Vibrationless and silent performance.

Standard range 1/33 h.p. to 15 h.p.

GEARLESS GEARBOX

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ALLSPEEDS LIMITED

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Telephone: Accrington 5441 (4 lines)

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SUGAR

in *any* form and quantity

can be mechanically handled with smooth efficiency by SANDVIK Steel Band Conveyors

Sandvik Steel Conveyor Band is cold rolled, having a smooth hard surface, and this quality is of particular interest to the sugar industry, as sugar can be ploughed off at any point of a conveyor by means of simple scrapers.

The first Sandvik conveyor for the sugar industry was installed in 1923, and there are now hundreds of these conveyors all over the world, handling beets, beet slices, pulp, raw sugar, all kinds of refined sugar, sludge, bone char, bags, boxes, etc.

Our photographs show (top left) Sandvik conveyors supplying Weibull Raw Sugar Silo at 250 tons per hour. The photograph above shows a storage conveyor for cube sugar.

Sandvik

STEEL BAND CONVEYORS LTD.

DAWLISH ROAD, SELLY OAK, BIRMINGHAM 29. *Telephone: SELly Oak 1113-4-5. Telegrams: Simplicity, Birmingham.*

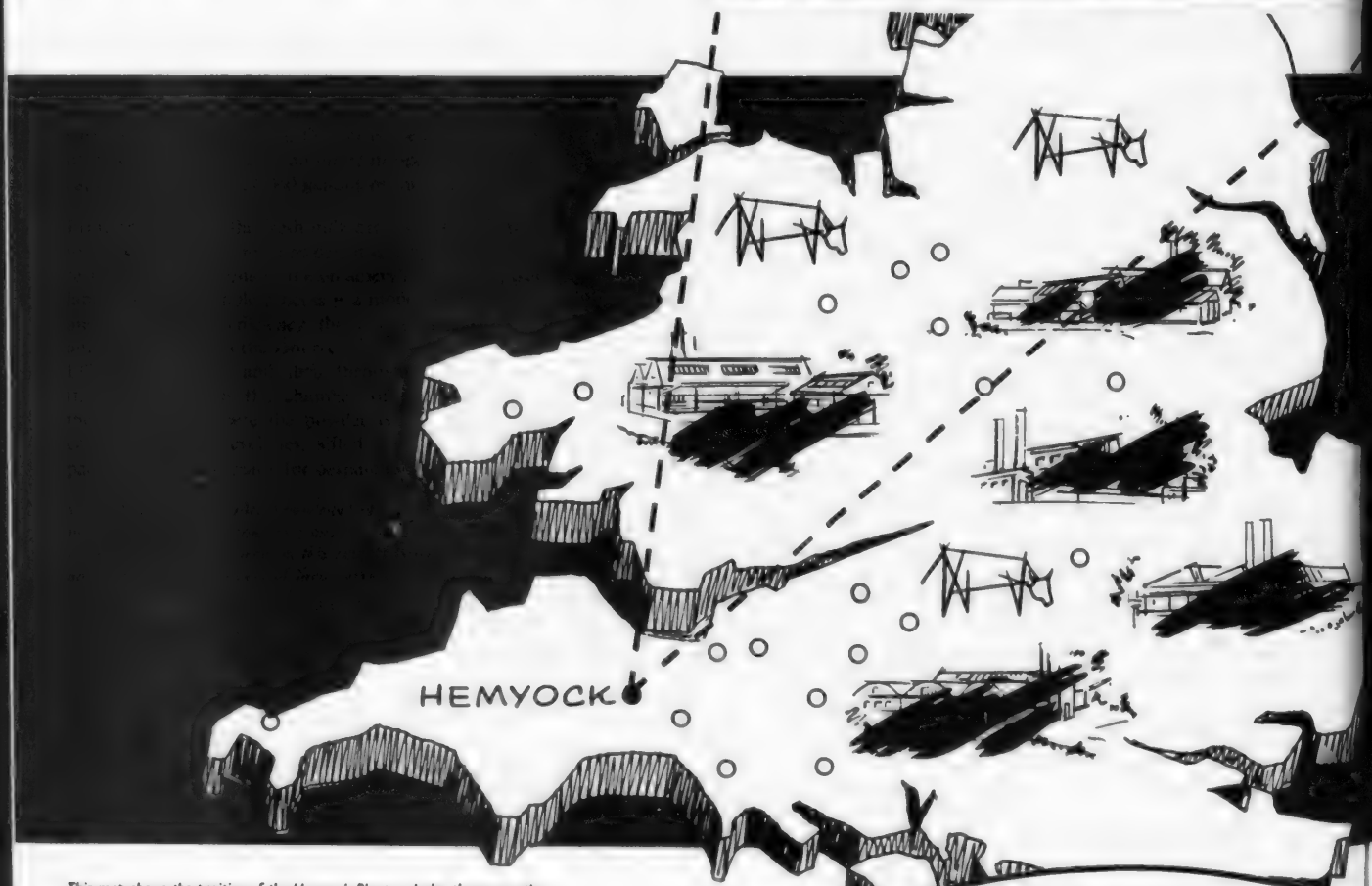
A MEMBER OF THE LARGEST DAIRY ORGANISATION

WILTS UNITED DAIRIES

HEMYOCK

MILK PROCESSING THE MODERN WAY

An exterior view of the Hemyock plant in its delightful rural setting.



This map shows the position of the Hemyock Plant and also the many other Wilts United Dairies Creameries and Factories all over the country.

FOR QUALITY AND SERVICE

WILTS
UNITED DAIRIES

IN THE COMMONWEALTH

for all forms of milk

PRODUCED AT HEMYOCK:
Spray Full Cream Milk Powder, Spray Skim Powder, "Kreemix" Complete Ice Cream Powder

PRODUCED AT THE OTHER WILTS CREAMERIES:
Full cream and skim roller processed powders. Full cream and skimmed sweetened condensed milk. Unsweetened full cream evaporated milk. Full cream and skimmed milk powder.

And, of course, Butter, Cheese, Cream and all other Dairy Products

WILTS UNITED DAIRIES

WILTS UNITED DAIRIES LIMITED

Trowbridge • Wiltshire

Telephone: Trowbridge 3611

View of the cyclones and Double Effect Evaporator incorporated in the new fully automatic Milk Spray Drying Plant at the Wilts United Dairies Creamery at Hemyock in Devon.

MALT PRODUCTS

A THOUGHT FOR FOODS

Protein additions?

Vitamin B complex?

Starch conversion?

Fermentation balance?

Flavour development?

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GIVE US FOOD FOR THOUGHT!

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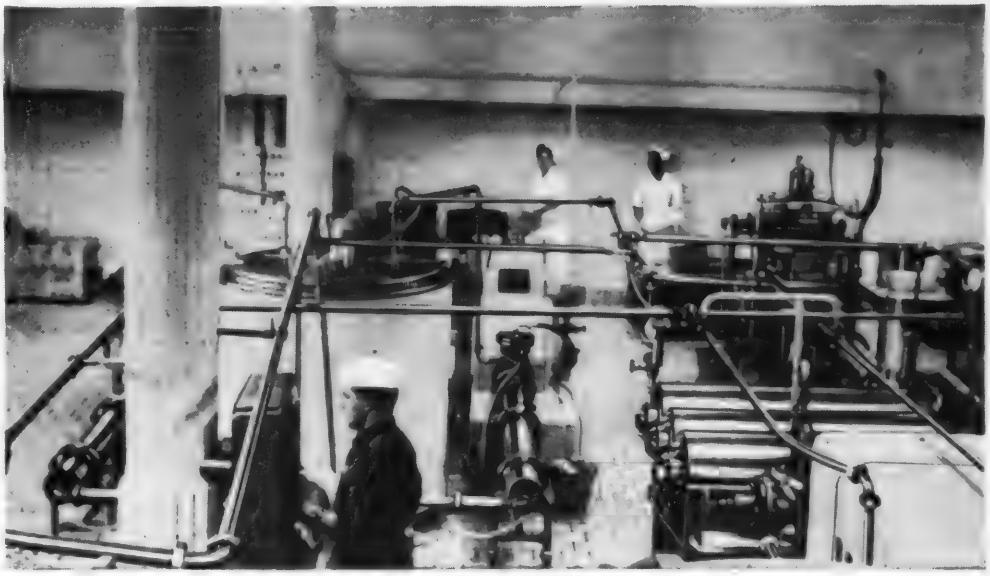
Maltsters for more than a Century

Modern Margarine Making



Photograph by courtesy of Margarlini Oy, Raisio, Finland.

WITH THE

★ Votator *continuous* PROCESSING APPARATUS

The high throughputs reached with Votator Apparatus require only a fraction of the staff employed to give a similar output by other methods. The plant requires virtually no supervision and the resultant product is superior in texture and flavour—with unvarying uniformity. The margarine arrives at the packing machines untouched by hand, via the Johnson Constant Pressure Buffer Units.

All over the world Votator Continuous Processing Apparatus is being used for automatic production of **Margarine, Lard, Marshmallow, Soups, Sauces, Gelatine, Turkish Delight, Starch Jelly, Biscuit Cream,** and many other well-known foods and sweets. The final product is superior in texture and flavour.

★ *"Votator" is a trade mark which applies only to the products of the Girdler Co. or their licensees*

PILOT PLANT SERVICE

Ask for the services of our Process Engineers and fully equipped Votator Laboratory for developing new applications or improving existing ones for continuous heating, cooling, crystallising, etc., of viscous or liquid materials by closed-processing plant.

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The packaging film that 'breathes'
When apples, tomatoes and similar products are packed for marketing, it is of the greatest importance that they should 'breathe.' This new film, while heat-sealable, is highly permeable and will keep fruit and vegetables in perfect condition.
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hygiene at HEINZ

Extraordinary precautions are taken to ensure cleanliness in the Heinz food factory at Harlesden, so naturally enough there are GRILL FLOORS around the pressure vessels which cook some of their products. GRILL FLOOR flooring does not harbour dirt and is easily cleaned, two important considerations in an industry where hygienic conditions are essential.

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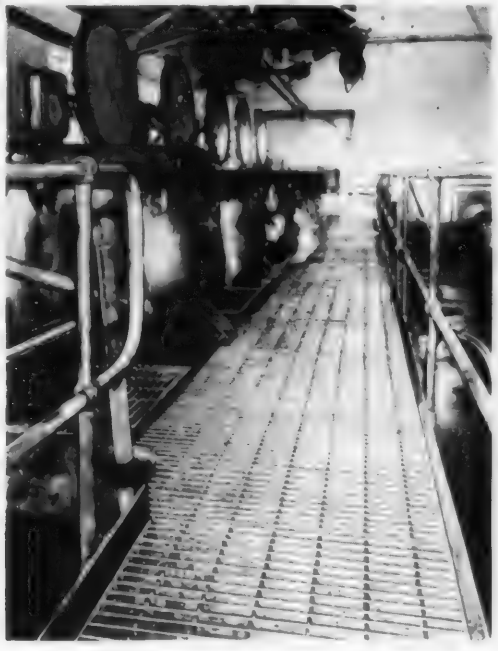

GRILL FLOOR flooring surrounding pressure vessels at Heinz, Harlesden factory, London.

GRILL walkways

GRILL FLOORS LTD LONDON W.10

TELEPHONE: LADBROKE 3066-7 (2 LINES) TELEGRAMS: ETYLADEC WESPHONE LONDON

P789

THE HEART OF THE MATTER

Plenty positive displacement pumps are suitable for almost all food and chemical processes. They can be supplied with fixed or variable and reversible capacity; and with Servo or automatic control. Illustrated is a special pump designed to the Milk Marketing Board's requirements. Fitted with a mechanical seal, this pump can be completely dismantled for thorough sterilizing in less than a minute without any tools. It is as easily and quickly reassembled.

PLENTY & SON Ltd.

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PROGALLIN P. Foodstuff Grade (Propyl Gallate)

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NIPANTIOX I-F (Butylated Hydroxy Anisole)

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antioxidants

The personal service of NIPA LABORATORIES LTD. ensures using the proper PROGALLIN or NIPANOX combination to give maximum protection to your products.

Knowing the correct antioxidant may be regarded as a science, and NIPA LABORATORIES LTD. have been practising this daily since 1939.

Our technical Staff is at your disposal without any obligation at all, to assist in selecting the most suitable antioxidant, or combination for your product or process.

Write or telephone, when we will get to work helping to solve your rancidity and stability problems.

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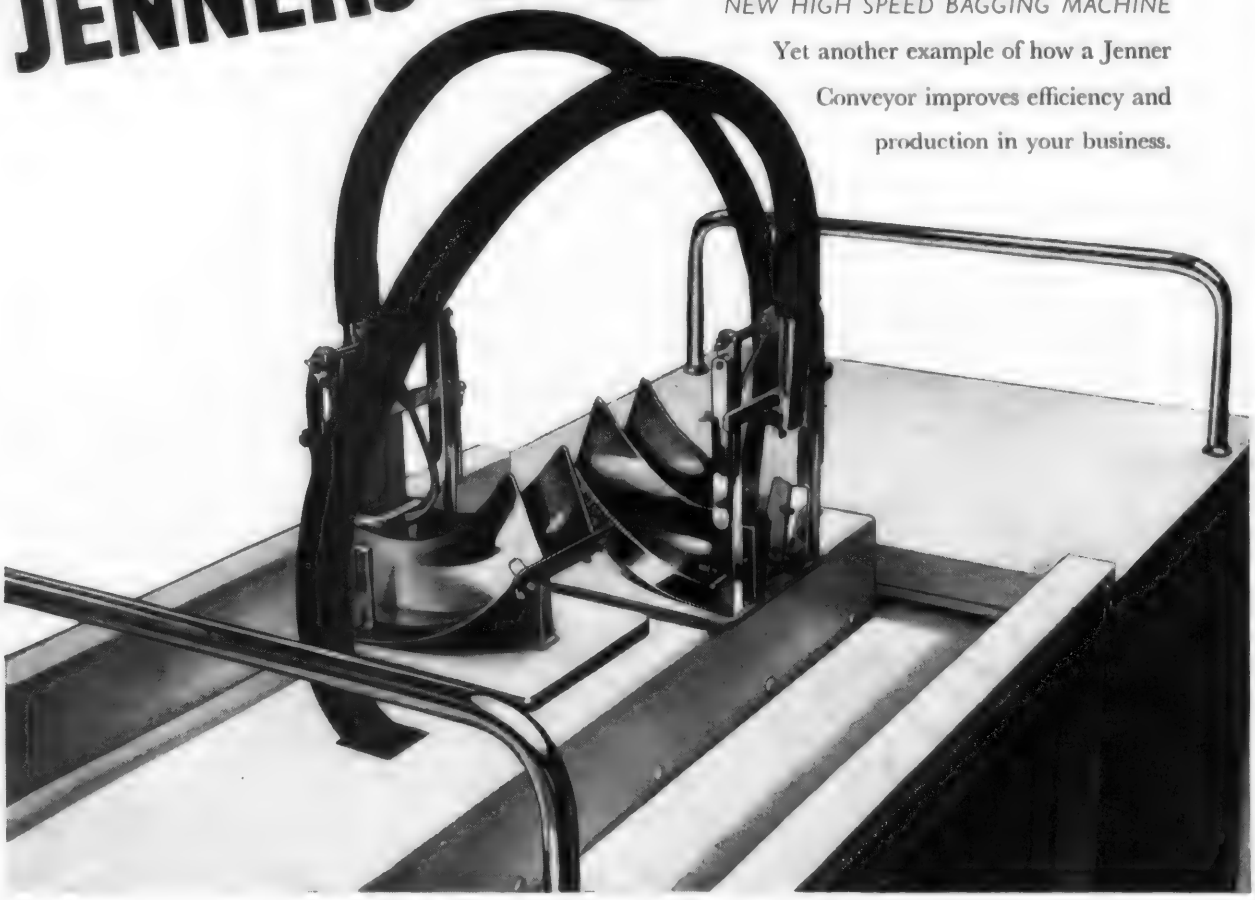
Once again!

JENNERS bag a winner!

NEW HIGH SPEED BAGGING MACHINE

Yet another example of how a Jenner Conveyor improves efficiency and production in your business.



Each unit is pre-loaded with bags which are automatically blown open as they progress to the 'ready' position. The operator merely picks up the article and puts it into the opened bag. The weight of the article pulls the bag away from the holding clip and allows it to pass on to the conveyor. One unit will bag up to 60 articles per minute.

The machine shown here is a twin conveyor unit produced to the requirements of Messrs. Winton-Smith Limited of Cambridge and is capable of bagging 120 pork pies per minute. The chromium plated bars support trays of pies which are tilted at an angle for ease of operation. Nothing could be simpler, more time and labour-saving.

Bag-opening machines by C. E. Douglas & Co. Ltd., 86 Strand, W.C.2.

FROM THE MOMENT JENNERS ARE CALLED IN, *IT'S 'IN THE BAG'!*

Write or 'phone for full details:—

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We save tons of vegetable oil every day...

Sharples Low-Loss process now in use all over the world

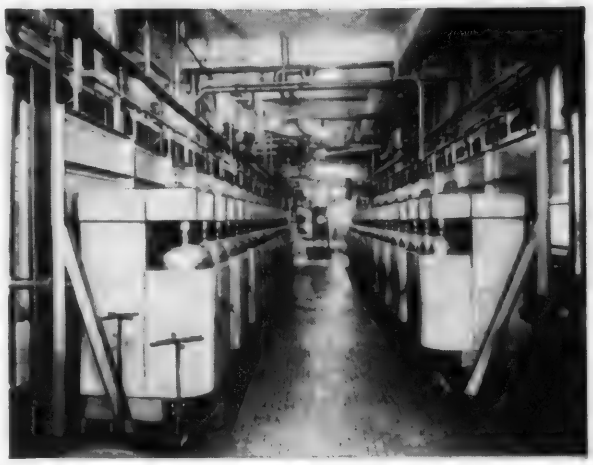
VEGETABLE OIL REFINERS in many different countries are saving tons of oil every day with the Sharples Low-Loss Vegetable Oil Refining Process. This really deserves its name. The savings are striking. Compared with Kettle refining 25%-40%. Compared with Caustic refining up to 15%.

Capital investment on a Low-Loss refining Plant is usually paid out of savings in less than 2 years and often in less than one !

How are these remarkable results achieved ? The basic idea is the application of the centrifuge in a continuous process. This idea has been backed by tremendous research, and development by Sharples including full scale development plants.

Today over two hundred plants are in operation each engineered to the specific requirements of individual plant conditions. But all of them have these common advantages. The oil produced is of best possible colour and quality. This quality is easily maintained without highly skilled control. The power requirements are much less. And operating costs are low.

Sharples are always ready to advise on any processing problem whether it's about a complete process or a single machine. Write to address below or 'phone Camberley 2601 and talk to Francis Hooley about your problem.



A typical Sharples Vegetable Refinery. Write for Bulletin No. 1273F for further information on this process.

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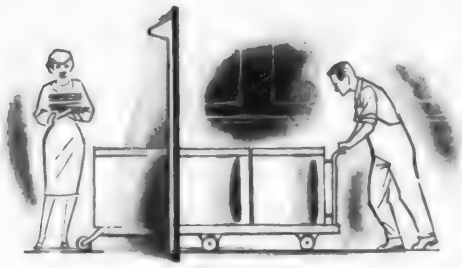
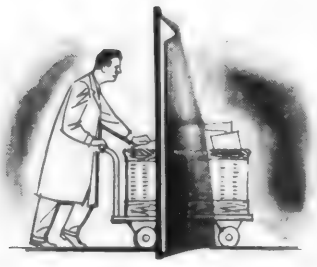
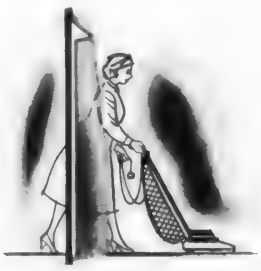
the safe



Safe because it is translucent, hygienic, allows easy passage for speedy handling of goods between departments where constant usage is necessary.



flexible



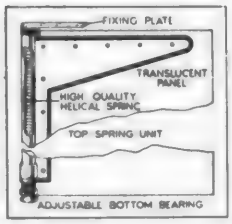
Flexible to allow wide manually operated trolleys to be used.

self-closing

door

Self-closing so that it cuts down draughts and noise.

The framework of the door consists of a vertical tube which fits close to the door frame. Concealed in the top of the tube is the patented double-action return spring, this is fully adjustable and ensures that the door is self-closing. The door pivots at the top and bottom on axles let into the lintel and into the floor.



NEWAY

Translucent Doors

★

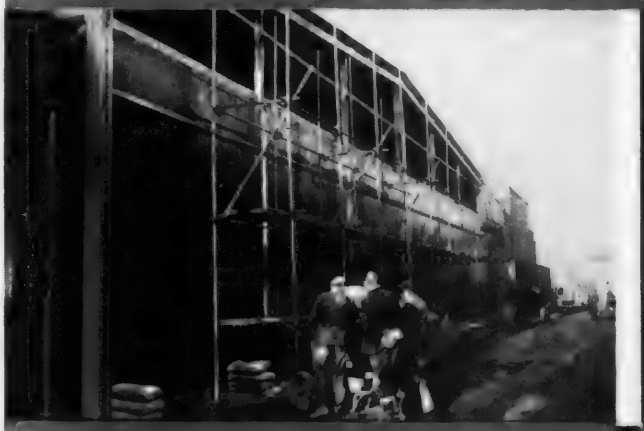
See Neway Flexible Doors at the Building Centre, 26, Store St., London, W.C.1, or write for free leaflet to the Manufacturers.

WILLIAM NEWMAN & SONS LTD. (Dept. FM) HOSPITAL ST., BIRMINGHAM 19.

Q Who should build your new cold store?

A Smiths of course!

And here's why . . Smith's complete service cuts construction time and costs, and gives you a quicker return on your invested capital.



Rapid progress on a new store at Kingston-on-Hull for Messrs. Kingston Deep Sea Ltd.

Shown here is the recently completed store at Grimsby for Messrs. Chr. Salvesen & Co.

This photograph shows progress on a new 400,000 c. ft. store at Craigmillar, Edinburgh for Messrs.T. Walls & Sons (Ice Cream) Ltd

Whether you want a small sectional store or a massive 1,000,000 c.ft. storage depot, we can handle the whole contract from the basic designs to the completed store. Our experience in the design and construction of cold stores of *any* size and unique construction techniques give you low running costs, easy operation, and speedy completion.

Smiths should build *your* new cold store.

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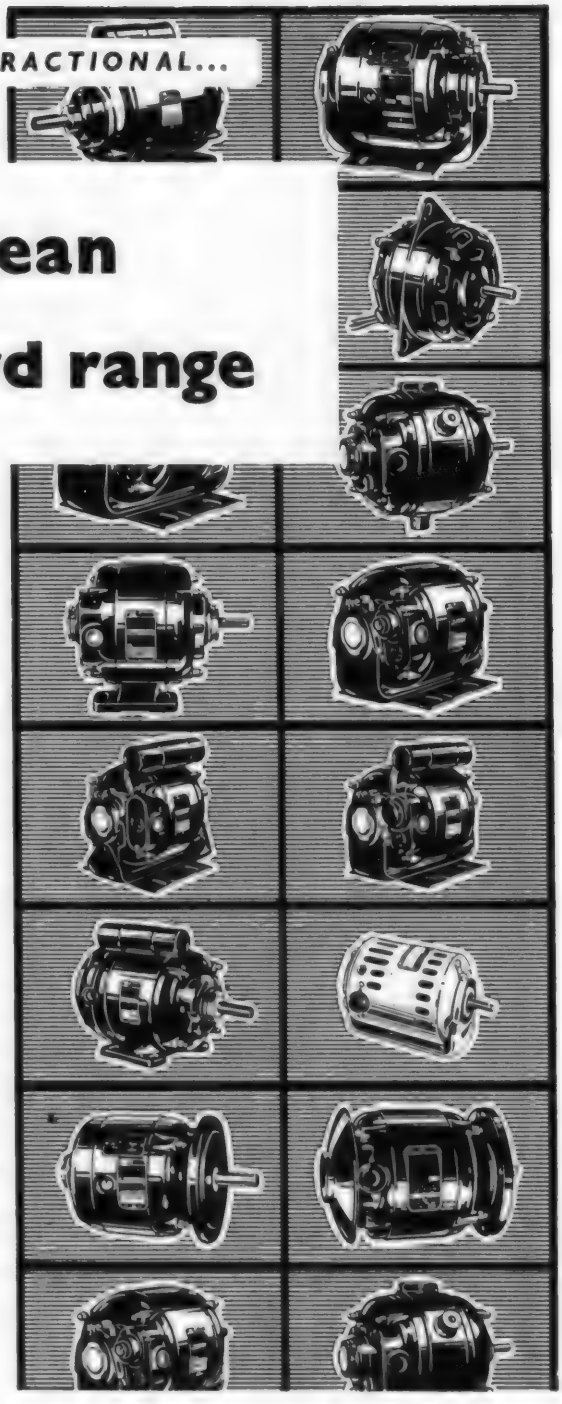
WHEN THE DRIVING POWER IS **FRACTIONAL...**

What we mean by a standard range



BTH fractional horse-power motors are made in a wide range—a wide range of mountings, a range of different enclosures and fittings, and a range of special-purpose types of which those illustrated form only a small selection. There is virtually a standard motor for any job. They are made in sizes from one-thousandth horse-power. There are base mountings or cradle mountings; spigot, resilient, ring or automatic tension mountings; horizontal, vertical and 'any-angle-you-want' mountings. There are AC motors, DC motors; geared units, auto-belt tension units; flame-proof or drip-proof enclosures; for high, low or medium speed applications at all standard voltages. Designers of machinery therefore have not only the widest field of choice but can take full advantage of standardisation and interchangeability.

A *'Fractional' Advisory Service For Designers*

The long experience of BTH engineers with fractionals for all purposes is at the disposal of designers. Consultation at the drawing board stage can save you time and trouble. When you are planning new machines or modernising existing installations, get in touch with BTH.

B T-H

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THE BRITISH THOMSON-HOUSTON CO. LTD., NEWCASTLE (STAFFS). ENGLAND

Member of the AEI group of companies

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JUST WHAT EVERY HOUSEWIFE HAS BEEN LOOKING FOR

the sauce bottle cap that combines perfect protection with finger-tip release

Made of pure aluminium with a P.V.C. (Polyvinyl chloride) disc, FLAVOR-LOK cannot rust, admit dirt, discolour the contents of the bottle. As its plastic disc is flowed, instead of punched, into the cap the bottle neck is sealed at the sides as well as the top. The simple, finger-tip release is made possible by an exclusive feature—a three start thread.

Every woman who likes your sauce or Ketchup will like it even more when she finds it has the new R.O. FLAVOR-LOK SEAL. For then, when she opens the bottle, she will find it as perfect as when it left the factory: no dirt or foreign matter under the cap, no dark discoloration. Yet — she can twist that cap off and on in one-third of a turn with her finger-tips.

FLAVOR-LOK has been introduced to Britain by Metal Closures Ltd, who are producing it by fully automatic flow-line equipment, specially installed to meet what is anticipated will be a tremendous demand.

R.O. FLAVOR-LOK SEAL

AND SET YOUR CAP AT NEW PROFITS

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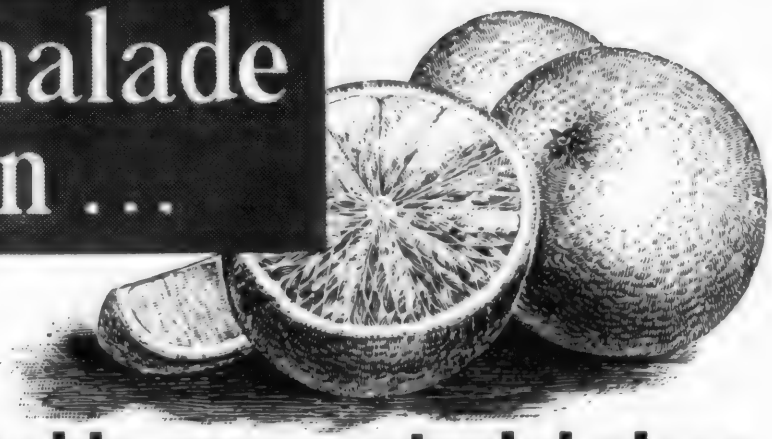
LONDON OFFICE · 40 BROOK STREET · W.1

Marmalade season . . .



Offset probable raw material rises by installing the Kellie automatic

"4 in ONE"

CUTS LABOUR COSTS BY 90%

Oranges, Lemons, Tangerines, Grape Fruits, etc., from 1¼" to 3½" diameter cut automatically into quarters, irrespective of shape. No Grading required.

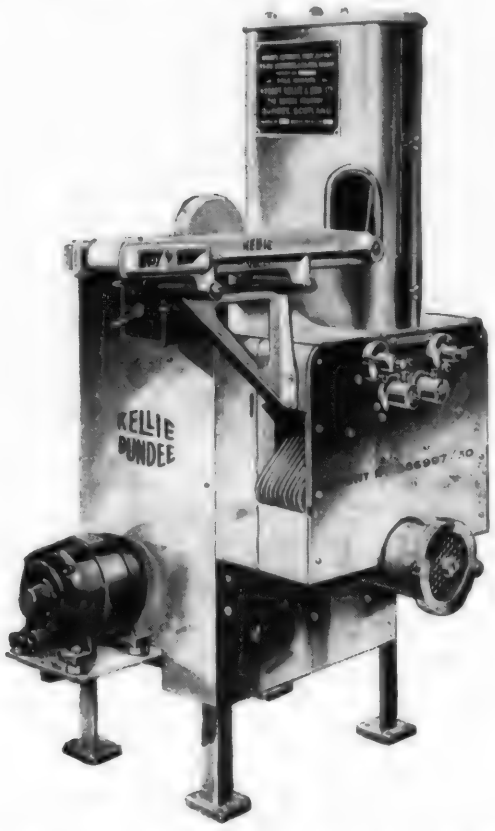
The fruit is automatically pulped, and the peel is separated to any required thickness from 1/32" to ¼", ready for shredding.

Thickness of peel instantly adjustable, micrometer accuracy being guaranteed; an absolutely clean peel, or one with a small proportion of pulp is obtainable at will.

Peel, fruit pulp and juice are delivered separately at 12 lbs. per minute. The labour costs for this output SHOW A REDUCTION OF OVER 90% over handwork. This alone would enable the cost of the machine to be recovered in a few weeks.

The risk of skin disease to workers is absolutely eliminated with this machine.

Arranged for direct coupled electric motor or belt drive with fast and loose pulleys.



This Kellie

1 QUARTERS
2 PEELS
3 SEPARATES
4 PULPS

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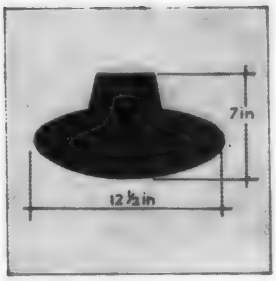

one of many decorative designs

The brilliantly successful G.E.C. 101 range of fluorescent fittings offers a wide choice of designs for every lighting requirement — in executive offices, showrooms, shops and stores, as well as factory areas. They are made for 1½ to 8 ft. single or twin Osram guaranteed tubes, and all employ the famous G.E.C. Basic Channel with its proven advantages of versatility and economy in installation and maintenance.

The fitting illustrated F41124/5 consists of a standard channel with an enclosed diffuser in reeded 030 'Perspex' with black ends and polished brass trim.

fluorescent lighting fittings

G.E.C.

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Presented with pride!

Seal your pack with "Viskrings" and establish confidence between you and your consumer. YOU can be confident that your bottling will reach the consumer perfect and intact. The CONSUMER will be confident that the contents are genuine and as expected—a fine product, perfectly presented. Seal all stoppered and screw-capped bottles with "Viskrings". There is a "Viskring" to fit every bottle neck, available in a wide range of colours. "Viskrings" can be printed with your brand symbol. Send your container complete with primary closure to us for fitting. We will return it with samples and quotations for any quantity.

- "Viskring" can be applied rapidly by hand—no machinery is necessary.
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- They prevent the movement of screw caps once they are tightened.
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- CELLULOSE CLOSURES . . . Contain No Metal . . . Require No Adhesive.

for your Sales sake fit "Viskrings"

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Salt users
– this is no pipe dream

In just 30 minutes, seven tons of Pure Dried Vacuum Salt can be piped direct into your brine-making saturator from any one of I.C.I.'s modern Air-discharge road vehicles. This method cuts out handling costs, bags and wasted storage space because the salt is stored *inside* your saturator. Nobody has to handle the salt, not even the I.C.I. operator. For efficiency and speed, there's nothing to touch it!

I.C.I. will gladly send you their free booklet 'Salt by Pipeline', which gives full details of this trouble-free hygienic method. If you use salt to make brine for preserving meat or vegetables or indeed for any other purpose it's really worth thinking about — I.C.I. is offering you the most economical and efficient method of buying Pure Dried Vacuum Salt.

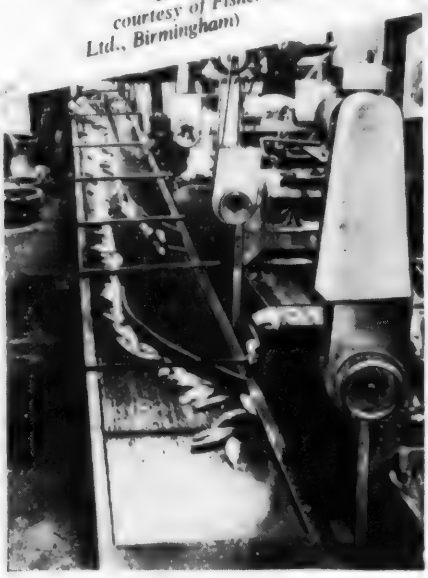
Write to:
IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1.

SCANDURA P.V.C. belting

helps the food industry

Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

SCANDURA P.V.C. BELTING IS MANUFACTURED BY **BBA**

BRITISH BELTING & ASBESTOS LIMITED · CLECKHEATON · YORKSHIRE

REIGATE BRAND
Chocolate Compound

Roll up! Roll up!
Customers buy again and again. Reigate Chocolate Compound—highly concentrated—for the genuine chocolate flavour and the natural chocolate colour.
Sample free.

Use ¾ oz. per 1 lb. of Swiss Roll

ESTD 1841
REI GATE
BRAND

WHITE, TOMKINS & COURAGE LTD.
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IT'S HERE—THE

COMMER *Superpoise*

6 TON TRUCK

Latest and greatest addition to the quality-built 'Superpoise' range, this 6 tonner—based on a well-proved design—stands supreme in its class. Engineered from first class materials, robustly built and easy to maintain, it will give long periods of economical and trouble-free service.

* Choice of 3 great power units: 91 b.h.p. petrol with optional chrome bores; 83 b.h.p. 'P6' diesel; 104 b.h.p. 'R6' diesel. * Deep-section chassis frame of *high-tensile* steel, and heavy duty rear suspension. * Exceptional bodyspace—standard factory-built dropsider is 186 in. long. * Superb visibility from low floor all-steel 3 seater cab equipped with every aid to driver comfort. * Outstanding engine accessibility simplifies routine maintenance. * Two-speed rear axle or synchromesh gearbox—with or without overdrive—available at extra cost.

A ROOTES PRODUCT—BUILT STRONGER TO LAST LONGER!

COMMER CARS LIMITED LUTON BEDS EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

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These five materials were developed to meet customers' special requirements.

LET OUR TECHNICAL SALES DEPARTMENT HELP YOU!

Phone for our representative to call and see you.

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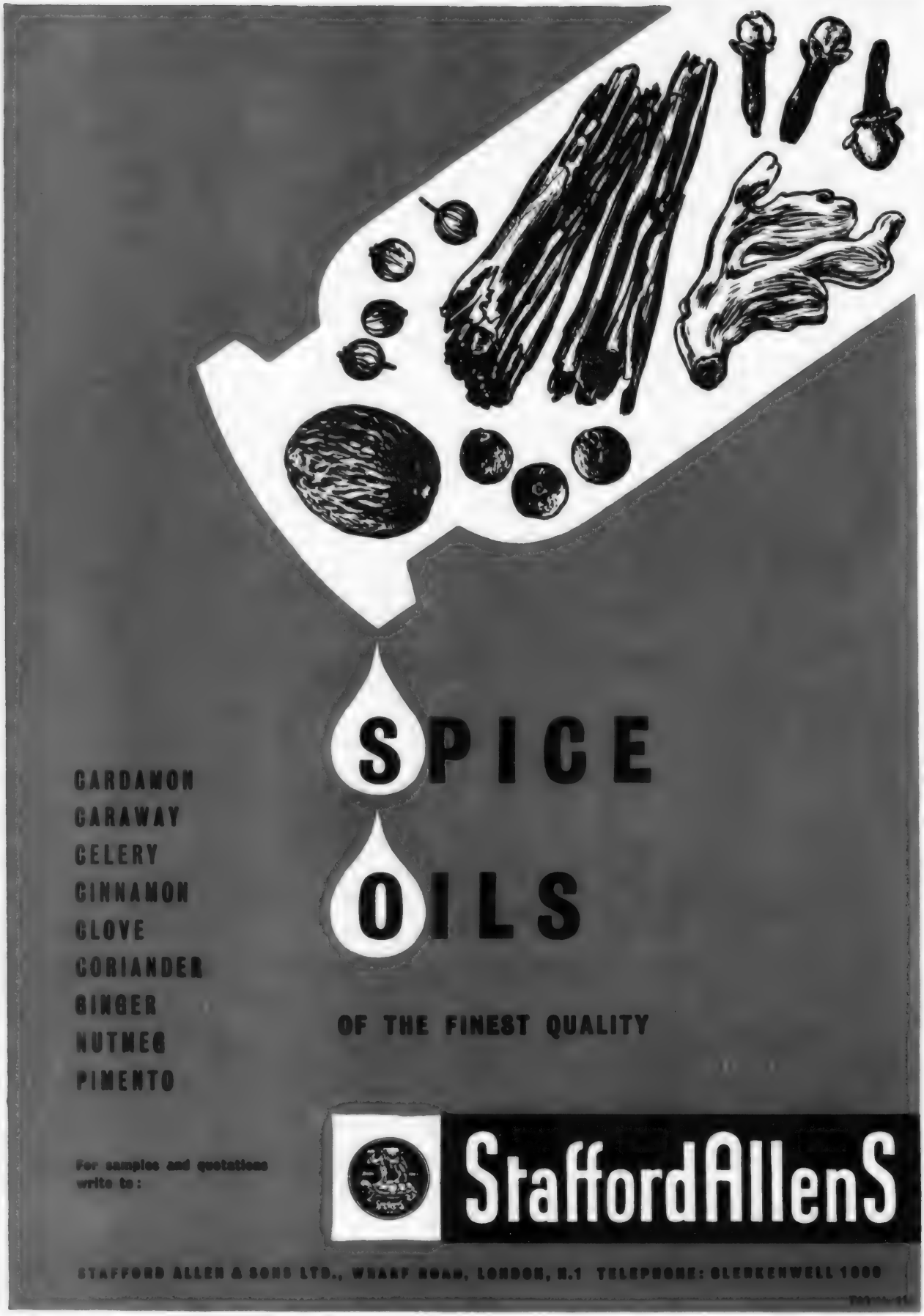
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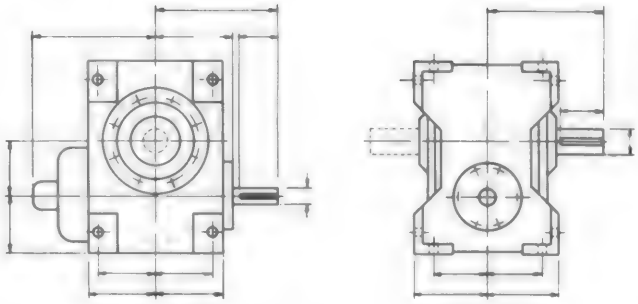

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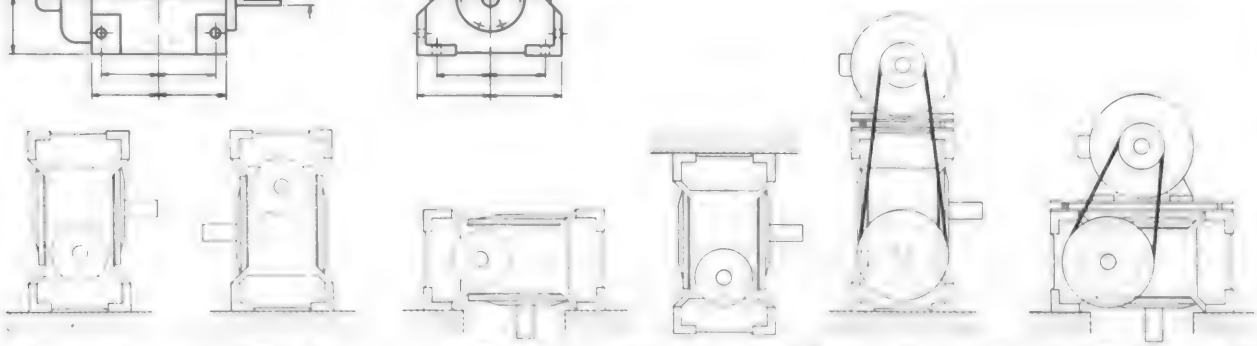

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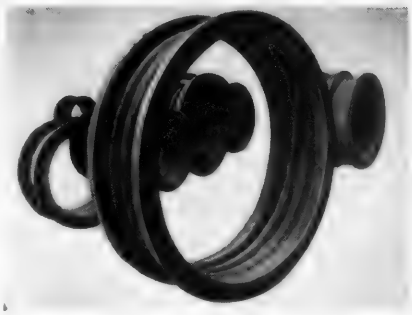

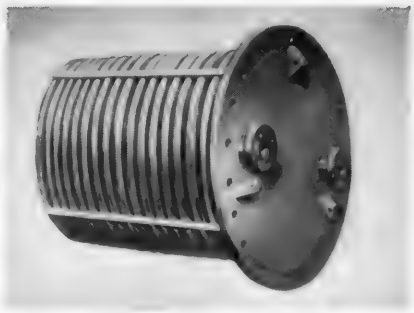

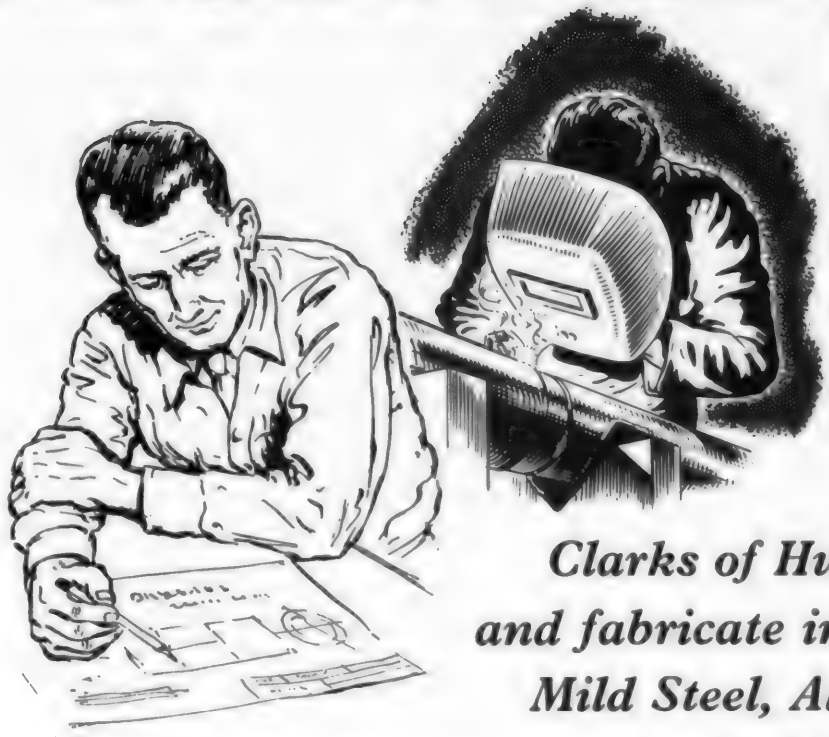

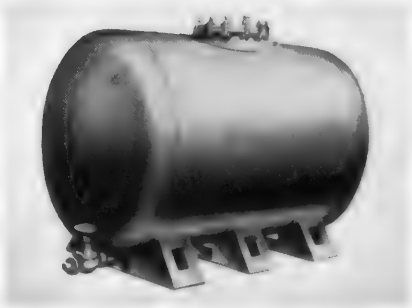

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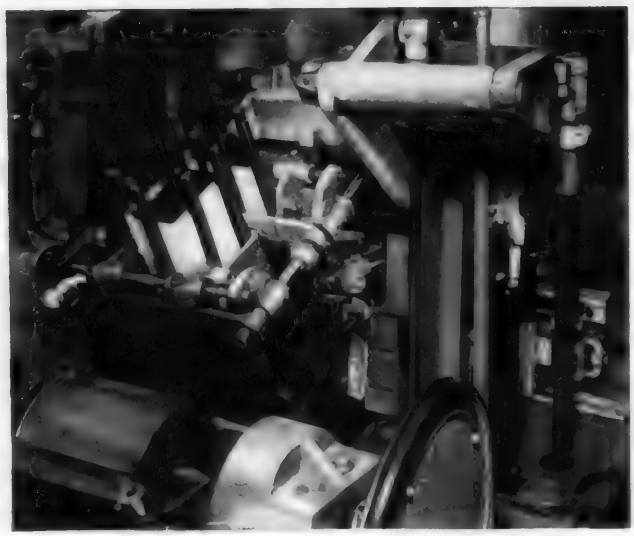

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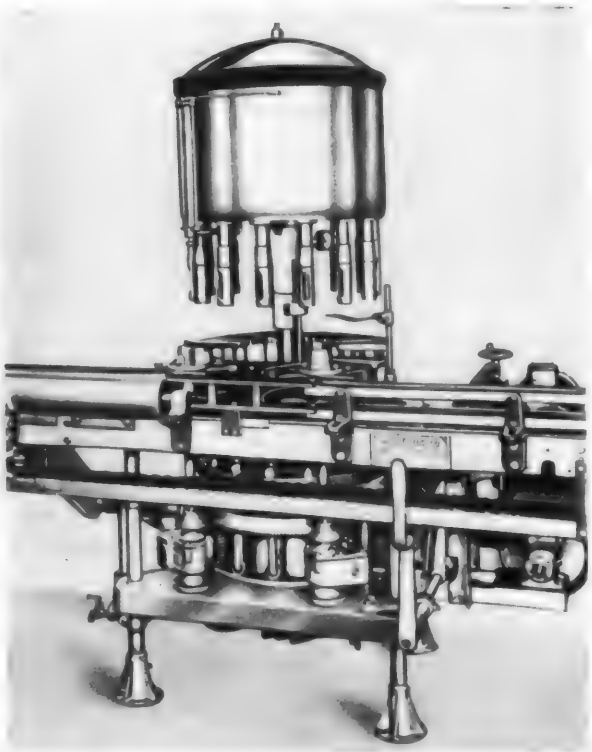

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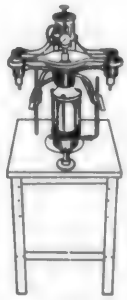

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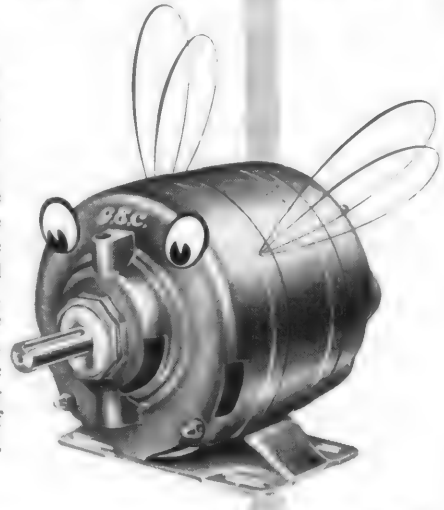

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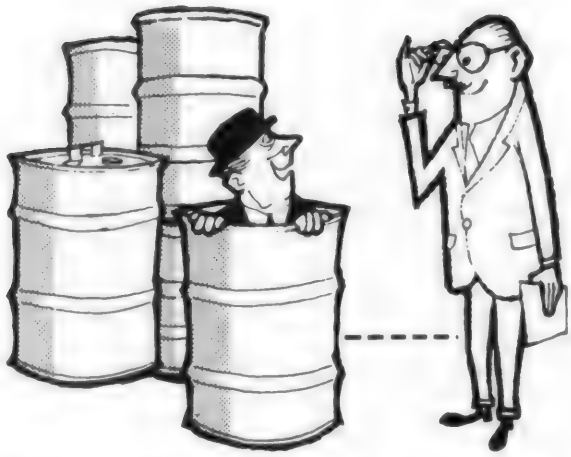

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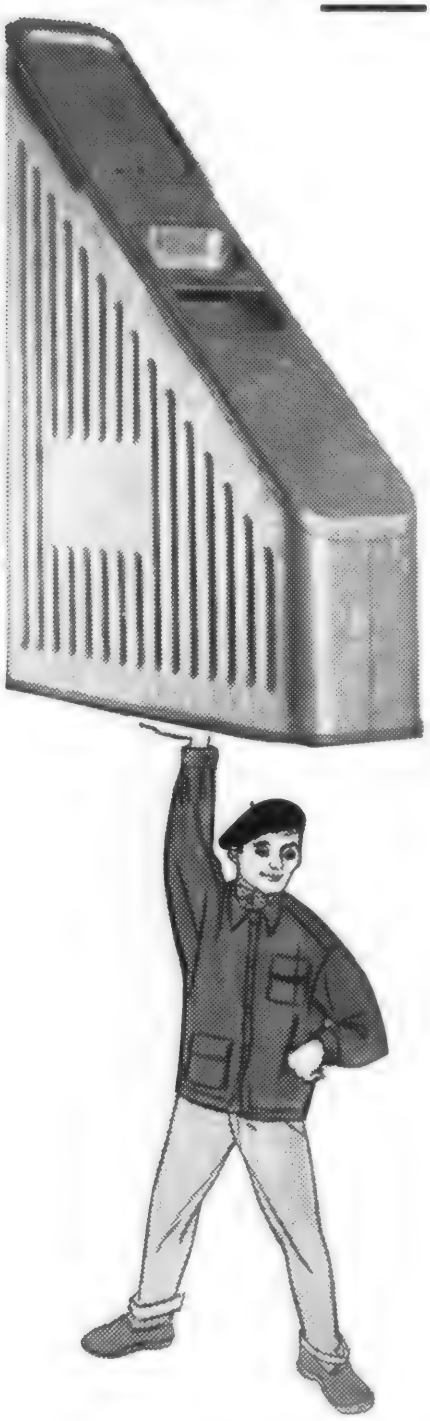

Charbonnages de France (the French coal authority) have found a clean, easy way to deliver coal—by packing it in corrugated sheet steel. This pack is a triangular jerrican holding 33 pounds of coal. The coal is delivered in the can, to be tipped from it straight into the stove or grate, thus avoiding the dusty, dirty shifting of coal from sack to cellar to scuttle to fire.

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This is only one example of the versatility of sheet steel as a packaging material. Ever since the early 19th century tinplate (which is sheet steel with a protective coating of tin) has been the premier pack for food. Without such stand-bys as bully-beef and dried milk, Great Britain would have been starved out by the rigorous blockades of two world wars. And today, despite much competition from new materials, tinplate maintains its pre-eminence as a food pack. No less than 3,500 million cans of food were marketed last year. There isn't a larder in the country that doesn't contain half a dozen tins "just in case."

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Food, being highly perishable, needs efficient protective packing to retain freshness. That is where tinplate comes in. More than any other material, tinplate fulfils all the functions of the ideal pack.

Tinplate affords complete and permanent protection to the product against climate, contamination and decay (a tin of beef 87 years old has been opened and found perfectly fit for consumption).

Because tinplate takes colour-printing as brilliantly as art-paper it is an excellent medium for establishing product identity. This characteristic of tinplate is increasing in importance as the popularity of supermarkets increases.

But the advantage of a tinplate pack most attractive to traders and the buying public is its convenience. A tin is easy to transport, easy to handle, easy to store, easy to open and easy to dispose of. For all forms of perishable goods, tinplate as a pack has no equal.

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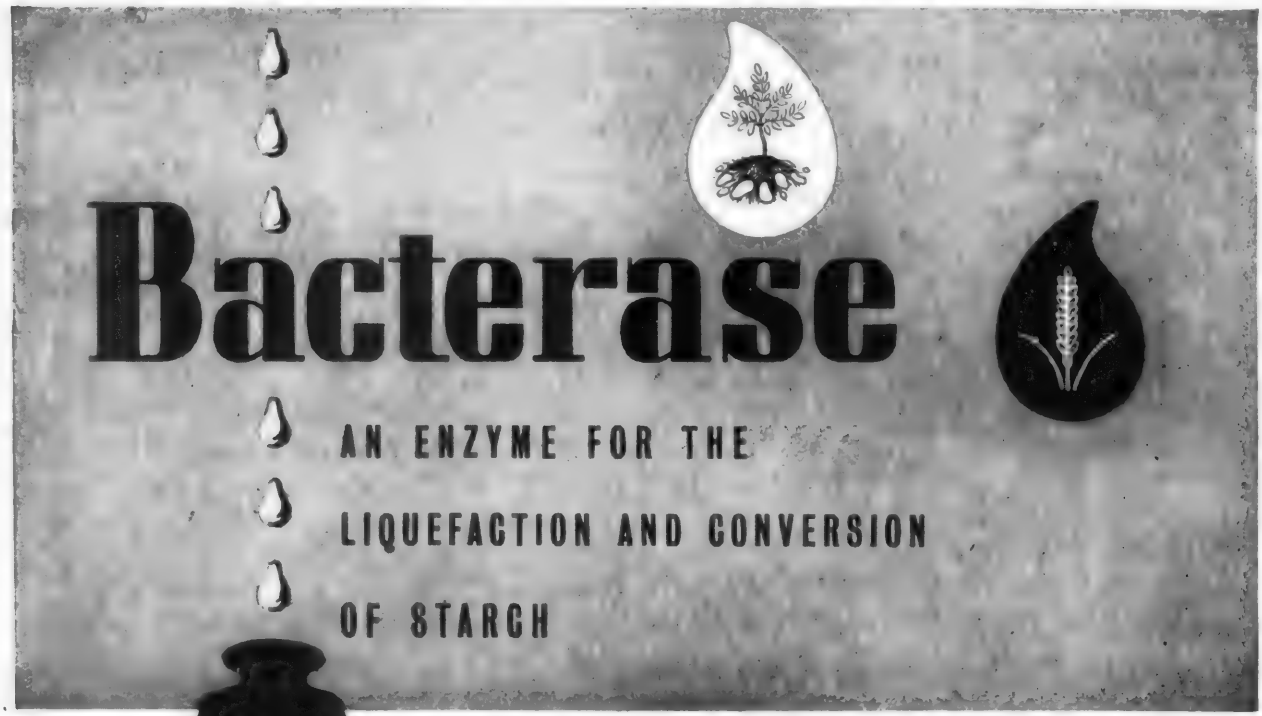

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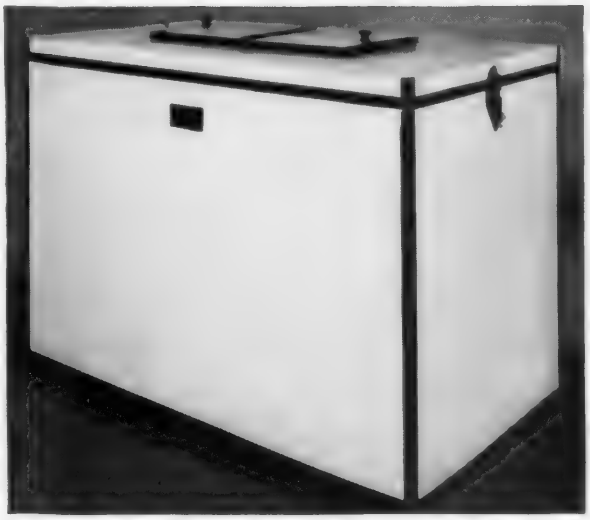

Hold-over cabinets for conserving ice cream faced with 'Darvic' and made by Alexander Battye (Battifreeze) Ltd., Leeds.

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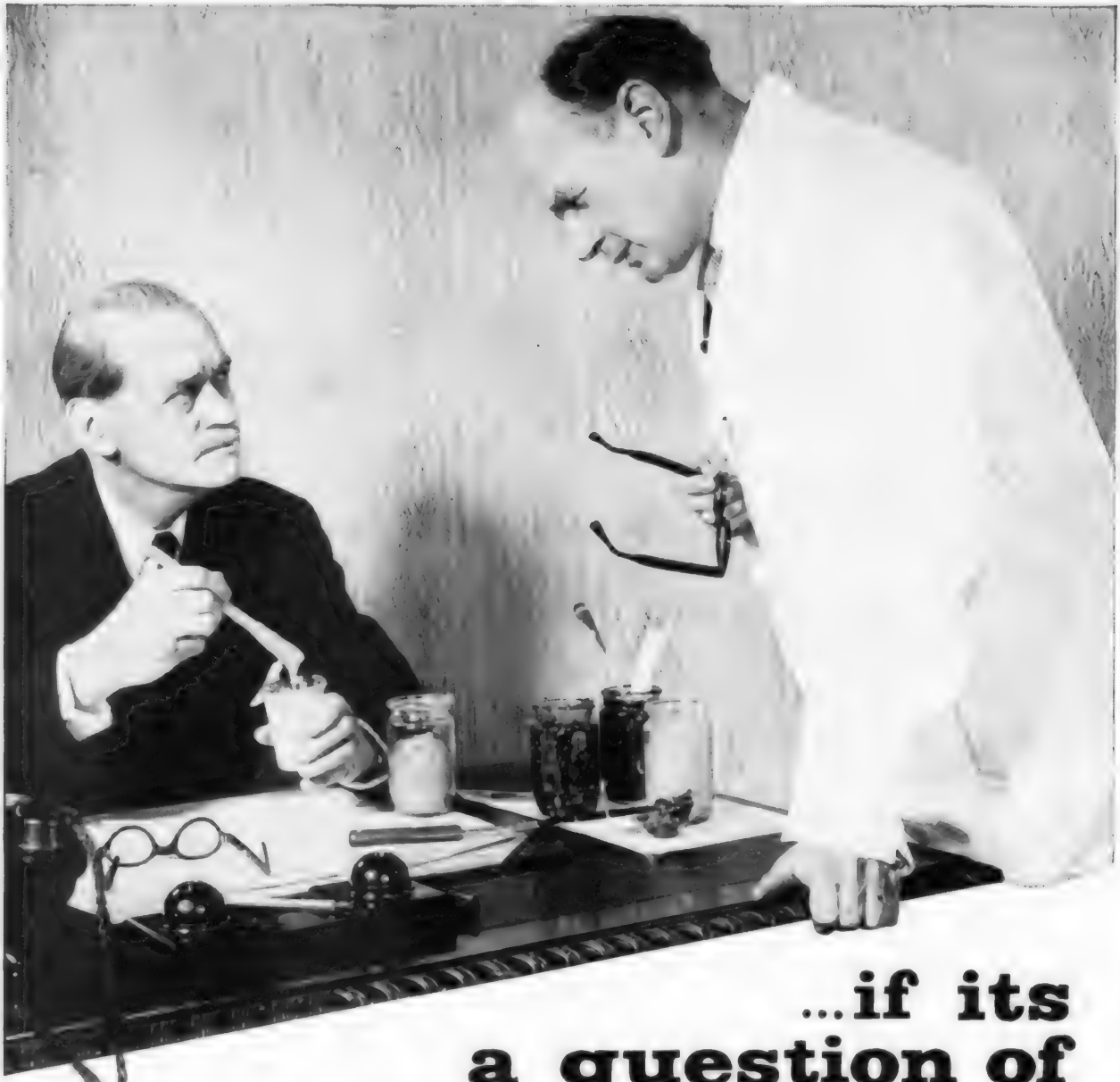

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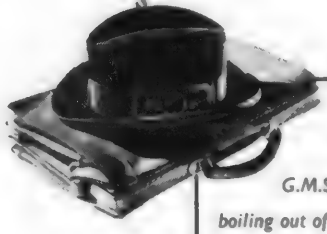

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FOOD MANUFACTURE

Vol. XXXIV, No. 2 February 1, 1959

The Navy's food

In line with the revolutionary changes in the administration and equipment of the Royal Navy in the last few years, attention is now being given to the question of victuals. The increasing amount and complexity of modern equipment and weapons, together with the trend towards a reduction in size of fighting ships and the emphasis on submarines, has meant that weight and space have to be kept down as much as possible, and those concerned with supply are giving much thought to the possibilities of using dehydrated food on a large scale.

We recently saw an interesting display of Navy food, past, present, and future, organised by the Royal Navy Supply School. For comparison, daily ration scales in force in 1590, 1731, 1844, and 1908, were laid out in kind side by side. Thus for 1590 we find that Jack Tar consumed 2 lb. of meat, 1½ lb. of bread, 1 gallon of beer, and a small quantity of butter and cheese; in 1731 oatmeal and peas had been added to the menu, the bread (or biscuit) had been reduced to 1 lb., and the meat ration was 2 lb. of beef on Tuesday and Saturday, 1 lb. of pork on Thursday and Sunday, while the remaining days were meatless. In 1844 the diet was still more varied; in addition to the foods already mentioned, fresh vegetables, sugar, tea, chocolate, and vinegar make their appearance, and the meat ration has been cut to 1 lb.; the gallon of beer had been changed to a quarter of a pint of rum. In 1908 we find the meat ration down to ½ lb., the bread also reduced, the vegetables, sugar, and tea increased, and the appearance in addition of condensed milk (¾ oz.), jam or marmalade (1 oz.), and 4 oz. of preserved meat. The rum ration has been reduced to one-eighth of a pint, and a new feature is the payment to messes of a cash allowance to enable them to buy additional food of their choice. Thus we see the gradual development in the light of experience of a balanced diet.

At the present time there is no ration scale; messes are allowed a cash grant of about 3s. 4d. per man per day to be disbursed as seen fit. The menus served, at least in shore establishments, would do credit to a first-class hotel; choices of courses are provided, which has been found to reduce waste. The reason is psychological; a man will more willingly eat food he has chosen and will more likely reject food he is compelled to eat.

Also on display were experimental dehydrated foods in which the Supply School is interested, both before and after reconstitution. These bore little resemblance to the dehydrated foods familiar during the last war. Pork chops, slices of lamb, soft fruit, vegetables, and fish can be dried in such a way that after reconstitution the original appearance, flavour, and colour are almost completely restored. It is said that the nutritional value is superior to that of canned food, while the weight and space saving, both directly and from the point of view of refrigeration plant, is of course enormous.

Feeding spacemen

With American and Russian sputniks chasing each other into orbit, one rocket passing the moon, and unfortunate dogs, monkeys, and mice being shot off into space, the era of space flight is rapidly approaching. Much has been learned about conditions in interplanetary space, and man-carrying space vehicles to follow the artificial satellites are already on the drawing boards. One weak link remains—the space traveller. He appears likely to present the greatest obstacle to successful space travel.

What is to happen to a man when he embarks alone for his voyage into the unknown, to live for months, perhaps for years, shut up in a tiny box, with every chance of not returning at all? Boredom and loneliness alternating with periods of stark terror will present psychological problems; weightlessness and the maintenance of bodily health are among the many physical problems, one of the most important of which is the question of food.

For a short voyage, it will be possible to provide varied and tasty concentrates, and for a longer expedition it may be possible to carry on for a time on tablets, although, lacking in bulk, these may permanently harm the space-traveller's system. For a trip of two or three months, needed to reach the nearest planet, it will be necessary to provide fresh food, balanced and tasty, if his morale is to be maintained so that he can arrive physically, morally, and mentally fit enough to face the unknown on Mars. Some form of closed-circuit biological feeding system

is quite obviously necessary. The wastes produced by the body must be reconverted into food on the pattern of Nature's cycle here on earth, but how much less scope there is in which to do this! From America comes news of a new strain of algæ which, it is said, can multiply a thousand-fold each day. Perhaps this will offer a means of growing and harvesting algæ in space ships, taking up less room and time than the traditional agricultural methods of earth. Perhaps, too, there may come of such research some new ideas for feeding the world's increasing population, which will provide an answer to the gloomy Malthusian prophets who see nothing but disaster for a world population doubled by the turn of the century. If spacemen are to live on algæ and those who stay at home on the pelagic plankton of the sea, let us hope that these new diets prove tasty!

There is nothing new . . .

WE might be forgiven for assuming that novelty is sometimes being made a fetish, to be pursued for its own sake. Our mind reels under the bombardment of the "new" things which have become a part of life within recent years. Inventions which have exceeded the wildest phantasies of Jules Verne or H. G. Wells are now taken for granted; new styles of art and new techniques are emerging from a glorious welter of past confusion and are taking shape to set some form of pattern for the future. In the midst of all this bewildering riot, many purveyors of pseudo-novelties have hooked themselves on to the band-waggon of progress and have been carried along with the rest, yet a few discriminating souls somehow are able to keep their heads above the mælstrom and eject these charlatans before they travel too far.

We are constantly being told of "new foods" which in reality are old ones dressed up in a new form. It has long been known that our agricultural economy is based on only a few of the hundreds of thousands of catalogued plants, and we would surely be safe in saying that the number of edible plants mentioned in the Bible, for instance, is much greater than those in common use. So references in the technical press to "new vegetables" cause us to sniff in mild derision. Sometimes we might be seen leaving our office on a dark, foggy night to disappear into the mysterious square mile to the south, where cosmopolitan creatures call to one another in strange tongues and the aroma of foreign dishes pervades the atmosphere. We would be discovered sitting in a corner of a small (and cheap) eating house, whose fame extends to Hong Kong but is unknown in Hampton Wick, consuming lotus roots, bamboo shoots, loofa, and other titbits known to countless generations of oriental peasants but unknown to the suburban housewife. Does it need the impressive weight of a research laboratory, and the high-sounding title of "new crops research," to bring to our notice the value of these "new" foods? New materials, new ideas—by all means yes; but let us not be mesmerised into an uncritical acceptance of all that is "new."

Antioxidants for fish

FISH meals and oils are important ingredients of animal feedingstuffs, particularly for poultry. Elsewhere in this issue the statement is made that from every 10 stones of fish handled by the fish markets, only $4\frac{1}{2}$ stones is used for human consumption, the remainder going for fishmeal. The fishing industry plays an important part in the national economy; some say that this part is not big enough, for with abundant supplies on our back doorstep and with meat the price it is, much more might be made of a valuable nourishing food which, thanks to the efforts of an industry which is becoming increasingly aware of the need for applying sound scientific principles, is being made more wholesome and more appetising. With more fish being consumed, greater supplies of fishmeal become available to help the growing poultry industry. Thus one industry helps another for the benefit of all.

The story does not end there, for high quality end products do not come from poor quality material. Any way of raising quality of fishmeal is of practical interest, and recent work in America suggests that addition of antioxidants to fish scrap to retard oxidative deterioration of its fats and oils pays dividends. Oxidation has a serious effect on the nutritional value of fishmeal and on its keeping qualities, a process which is accelerated by spontaneous heat generation in scrap piles. Many processors reduce the latter effect by turning and mixing the piles at frequent intervals to dissipate accumulated heat, and the labour involved is considerable. This might well be reduced if antioxidants were used. The subject is one to which British research workers might well devote increasing attention.

Toxic sweet wrappers

THE health committee of the Association of Municipal Corporations, which represents Borough Councils throughout the country, is urging the Minister of Food to legislate against the use of colouring matter containing lead in the printing of sweet wrappers. This follows a letter from Ilford Borough Council to the Ministry, which stated that its public analyst had discovered lead, to the extent of 3·3% and 2·5%, in the colouring matters of paper wrappers round two samples of toffees. The toffees themselves had shown no evidence of harmful lead contamination, but the medical officer of health was justifiably perturbed

lest harm should be caused to a child who should suck such wrappers. It is reported that the manufacturers of the second sample agreed to consider the matter, but that the manufacturers of the first sample were unco-operative.

It is astonishing to discover that in these so-called enlightened days, toxic materials are used in connection with food wrappers; it is regrettable that our food regulations do not as yet cover such a contingency. Our January issue contained an article on the manufacture of paperboard for food cartons, in which the care taken to prevent the slightest possibility of food contamination was stressed. We would have thought that even more care would be taken in the manufacture of wrapping paper which actually comes into contact with food; this apparently is not so. The danger of poisoning may well be remote, but the principle is a bad one, and the Association of Municipal Corporations is to be commended for drawing attention to the matter.

A matter for regret

COMPARED with other industries, the food industry's accident record is poor, and has deteriorated in the last five years. During 1957 there were 12 fatal accidents and 9,868 other accidents in the industry, including 699 to young persons. These figures are revealed by the annual report of the Chief Inspector of Factories, who says that taking industry as a whole, 27·4% of accidents happened while goods were being manufactured or carried, 15·8% were caused by power-driven machinery, and 13·8% by falls.

There has been a 5% improvement in accident figures over the previous year throughout industry generally; why, then, does the food industry show a reverse trend? The report says that the general improvement is due to changes in working methods and to implementation of effective safety measures. Is the food industry lacking in either or both of these factors? We know of many modern food factories whose installations are second to none and whose safety and welfare facilities are given prime importance. We know, too, of unsafe, unhygienic factories still using hole-in-corner bucket-and-spade processes, with unshielded antiquated machinery; fortunately, such are few and their number is declining, but how they manage to evade the vigilance of the factory inspectors remains a mystery. A low accident record does not happen by luck; it springs from an attitude of mind pervading downwards through an organisation from the top management. Factory safety should not be left to the "welfare officer," who is usually powerless to do more than supervise first-aid facilities. The problem goes much deeper, and managements, before all others, must become accident-conscious.

Back to the countryside

THE drift of population from the rural areas has been a marked feature in this country since the industrial revolution. As industries developed they were sited in or near large towns, for obvious reasons—the availability of labour, better communications—in general, because of all those advantages for which the towns themselves existed. Although most people agreed that the increasing herding together of large masses of humanity into our cities was a bad thing, the trend continued unchecked until the last war created a need for evacuation and decentralisation. Although many firms were compelled to set up factories in the countryside purely as a war-time emergency measure, not only have the factories remained there since but the outward movement from the cities has continued.

The population density of this country is grossly irregular; the south-east and the midlands are very densely populated, while large areas are thinly inhabited. The geographical reasons which brought about this state of affairs are becoming less compelling. If humanity is left undisturbed by such distractions as nuclear wars, the development of atomic power, and the provision of a really first-class road system should, in a few decades, bring about a profound and beneficial rearrangement of our industrial structure. The food industry in particular is probably more flexible than most. Its raw materials are almost entirely natural products; novel foods may in the distant future supplement but are hardly likely to replace the existing ones. By their nature these materials are most abundant away from the centres of population, and it is not surprising, therefore, that the food industry today is the most decentralised and widespread of all industries.

Industrialists have fought shy of moving into a rural area unless compelled to do so. One of the reasons has been the uncertainty and scepticism prevalent among urban employers concerning the quality of rural labour; an investigation recently carried out suggests that this attitude is misconceived and erroneous. The experience of firms who have already moved into rural districts and who have decided to stay there is that there is no marked inferiority of rural workers compared with urban.

It is good to see that the London County Council has taken the initiative in setting up an Industrial Centre at County Hall, London, S.E.1, to give advice and assistance to industrialists on the problems of moving to centres outside London. The L.C.C. is co-operating with the country towns of Bletchley, Bury St. Edmunds, Edenbridge, Haverhill, Swindon, and Thetford to provide opportunities for industry in respect of factories, labour, and housing for the workers. For too long have our cities been allowed to grow unchecked.

Improving protein

ALTHOUGH cereals such as wheat, millet, and rice form the staple diet of much of the world's population, these foods alone cannot provide completely the protein requirement of the body, and other foods, such as meat, fish, eggs, and milk are needed as well in order to provide full nourishment. Unfortunately, in many parts of the world there is not enough of these additional foods to go round, even where the supply of cereal is adequate, and the nutritional problems which face under-nourished peoples are caused as much by the fundamental inadequacy of the basic diet as by its insufficient quantity.

The protein deficiency of a cereal such as wheat is a deficiency in kind, not of quantity. Proteins of infinite variety are built up from a small number of amino-acids, one of which is lysine; without lysine, the efficiency of the body's tissue-building and repair processes is impaired. Wheat, millet, rice, and other cereals, even though good sources of energy, are deficient in lysine, and the proteins they contain are not fully available for the body's vital processes.

Recent work has shown that by the addition of small quantities of pure lysine to cereals, the proteins they contain become as nutritionally complete as those of meat, fish, eggs, and milk. The possibility arises of supplementing with lysine the food of those countries, such as India, whose basic diet is mainly cereal. A few years ago such a large-scale supplementation would have been impossibly expensive, but a recent American estimate puts the present-day cost of dosing the adult's daily requirement of cereal, to provide sufficient of the right kind of protein, at about 2½d. Large-scale production may bring down the cost even more.

In the domestic sphere also, lysine supplementation has possibilities. Poor protein nutrition is a contributory factor to complications during pregnancy, and work carried out in Texas indicated that the addition of lysine to the diet of expectant mothers reduced the incidence of anæmia and other blood deficiencies, reduced fatigue and lassitude, promoted a feeling of well being, and increased the rate of convalescence after delivery.

Czechoslovakian International Trade Fair

FOREIGN trade has in recent times assumed a large place in Czechoslovakia's economy, and the import-export turnover of this industrialised country has more than doubled in the last ten years. More than a tenth of her industrial output is exported, a large proportion of which is machinery, engineering, and processing equipment. Correspondingly high import figures offer opportunities to British manufacturers.

Trade exhibitions were held in Brno, the second largest city of the Republic, in 1955, 1956, and 1957. It had been planned to hold an International trade fair in that city last year, but the unexpectedly great response required its organisation on a grander scale, and the fair was postponed. It is now planned to hold it from September 6-20, 1959; the majority of the exhibits will, of course, be of engineering interest, but we note that among the list of items there are food processing machinery and equipment, and refrigerating plant.

British bacon

THE first annual report of the Pig Industry Development Authority shows that in the minds of its members the quality of bacon is more important than its origin, which is as it should be. Imported bacon is required by law to be marked to indicate its country of origin; the question naturally arises, should British bacon be similarly marked? "After the most careful thought," says the Report, "we do not consider that it would be in the interests of the industry to mark the whole output irrespective of quality solely to indicate that the bacon is of British origin. We do not think it would be reasonable, or likely to be helpful, to offer consumers a mark that had no relevance one way or the other to quality. We think that no explanations that might be offered would dissuade consumers from supposing that a P.I.D.A. mark was meant to convey some indication of a standard."

The Authority's opinion that time is required before a quality standard can be established and enforced is an indication that quality, both in respect of pig production and of curing, needs to be improved, a statement which may be obvious but which needs to be reiterated in the interests of the industry. What the Authority has in mind as an interim measure is a mark to indicate that Wiltshire bacon, which comprises more than 85% of all the bacon output of Great Britain, has been prepared in suitable premises in accordance with an approved code of practice. As it relates solely to the curer's share of responsibility, the Authority rightly believe that such a mark should not be intended for the consumer, who is unlikely to appreciate the distinction. The British Bacon Curers' Federation have agreed to co-operate.

Until a mark indicating a standard of quality, and intended to be seen by the general public, can be applied to British bacon, a publicity campaign on a scale comparable with that organised by Danish bacon interests is premature; but funds are being set aside and plans laid to mature when the time is ripe. The porker is an essentially British institution, which in days of old provided the bulk of our forefathers' meat. It is very desirable that he should regain some of the importance he used to have.

(*Left*). **Trolleys of haddock holding about 30 stone of fish apiece are being wheeled into one of the four smoking kilns at the Ross Group's new Grimsby factory.** (*Right*). **A trolley of smoked kippers being withdrawn from a kiln after being smoked for 3-4 hours.**

Fish Processing Streamlined in New Ross Factory

At the Ross Group's new fish smoking and curing factory at South Quay, Grimsby, the emphasis is on product quality, uniformity, and sales appeal. FOOD MANUFACTURE was shown how these ideals are realised in terms of men, machines, organisation and the investment of £150,000 during an exclusive visit last month.

THE foundations of Ross Group, Limited, were laid in 1895 when the late Thomas Ross, father of the present chairman, J. Carl Ross, moved from Filey in Yorkshire to Grimsby and started in business as a fish merchant.

In 1929 Thomas Ross retired, and the reins of management were taken over by the present chairman. Since that date, a number of amalgamations and acquisitions of companies have extended the interests of the Group to cover trawling, distribution, processing, and marketing of fish and its products. At the present time, the Group operates 38 trawlers from Grimsby and 11 from Hull, owns a number of depots and food processing factories all over the country, and maintains a country-wide delivery service; its products are exported to all parts of the world.

The new factory

The new processing factory at South Quay, Grimsby, was opened two months ago, and is said to be the most modern in the world of its kind. Costing over £150,000, the building covers 30,000 sq. ft. on a site of 50,000 sq. ft. The land on which it is built was reclaimed from the Humber estuary, and the factory has been built on a foundation of 140 piles each 40 ft. long. All the factory area is on a single floor at vehicle height to facilitate loading and unloading.

The core of the factory is a battery of four Torry fish smoking kilns, which were developed on the basis of work carried out at the Torry Research Station of the D.S.I.R. A striking feature of the plant is the high degree of mechanisation achieved, covering such operations as the filleting and splitting of haddock and herring, the disposal of offal, and the packing of the final product. Nevertheless, mechanisation has not been made a fetish; operations such as cod filleting are done by hand because it is the best way still. A careful efficiency balance has been struck between manual and automatic operation.

Logical principles have been applied in planning all aspects of the factory from the very beginning. The layout is such that raw material is received on one side and the finished product is removed from the other. During processing and handling material is moved in such a way that wasteful cross movements are avoided. This principle is applied even to the most minor of auxiliary requirements and packaging materials. Thus no one gets in anyone else's way, movement is orderly and unhurried, even in moments of stress, and when emergency conditions arise calling for maximum output, the plant is well able to cope with them.

Raw material

The day's work really begins at the fish market, where the trawler catches landed and sorted during

the night are auctioned at 7.30 in the morning. The catches of Ross trawlers are not reserved exclusively for Ross factories; they enter the common market and Ross buyers bid on equal terms with other buyers. The fish arrives at the factory in the metal kits, holding 10 stones apiece, in which it was bought in the market; the kits are placed on pallets alongside the first processing line, or, if not required for immediate use, in the raw material cold store, where it is kept until needed at 34°F. This store can hold 7,000 stones of fish.

There are three loading bays for raw wet fish, respectively for cod, haddock, and herring. These follow separate processing lines through the factory, and although the processing area is well-filled and no space is wasted, careful planning has allowed flexibility and interchange to occur between the processing lines as required without interference with order and continuity.

A general view of the factory showing, in the left foreground, the filleting line. Fresh cod is being filleted by hand; the fillets are placed in pans which when full are attached to the overhead conveyor; the heads and bones fall into the trough beneath whence the offal is transported by moving belt to a lorry waiting to take it to a fishmeal factory.

A view of the four smoking kilns, with, on the left, the brining tanks. After brining and draining, the fish pass on trolleys into the kilns; after smoking, they are withdrawn from the right for weighing and packing. On the right the boxes of weighed fish are travelling along a conveyor to be closed and dispatched.

Processing operations

The main operations carried out are: filleting, brining, smoking, and packing and dispatch both of smoked and wet fish. The sequences of operations for each kind and variety of fish are different, and although the initial process of filleting (in the case of finnan haddock splitting without removal of the bone) is common to all, the methods of carrying it out differ for each.

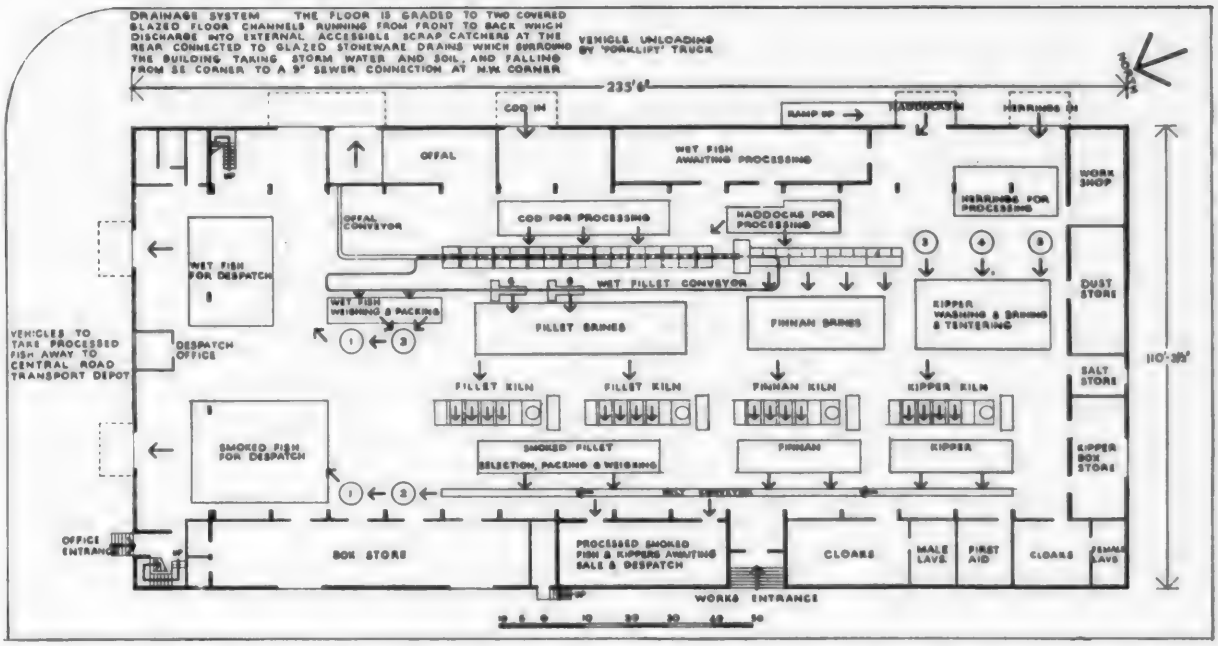
FILLETING

The filleting line occupies one side of the factory alongside the unloading bays, and is divided into two main sections, for cod and haddock. Herrings are also filleted, but they are processed automatically by machines which will be described later.

Codfish

The palleted kits are placed alongside the filleting line and fish are drawn from them by the filleters, who work in pairs. With swift deft movements each fish is cut and the flesh separated from the backbone and head; the fillets are placed in a tray and the bones and heads dropped into a trough in which is a moving conveyor. When full, the pans of fillets are placed on an overhead conveyor which takes them to the inspection and control section where the yield is weighed and inferior fillets rejected. Meanwhile, the bones and heads which have been dropped into the trough are automatically discharged into a lorry trailer which takes them to a fishmeal factory about four miles away.

The weight of fish given to each pair of filleters and the weight of fillets obtained from them are measured, and the difference, in conjunction with their output in a given time, is used as a basis for computing the production bonus paid to them. The bonus calculation takes into account both skill and speed, for it is possible for a man who removes less flesh from each fish, yet who is extremely rapid, to earn as much bonus as a man who is more skilful at removing all the flesh but who works more slowly. Working in pairs introduces a beneficial competitive



spirit which keeps men on their toes. From every 10 stones of fish, about 4½ stones of fillets are obtained, the remainder being rejected.

Filleting machine

To increase output at very busy times, a German *Baader 338* filleting machine is used to supplement the work of the filleters. This machine accepts fish up to 27 in. long. The fish, after being hand-fed, pass over circular rotating knives, which remove the heads and tails, then on to the periphery of a rotating table which takes the fish over fixed knives which cut off the flesh and remove the backbone. The machine is speedy but cannot handle the larger fish, and supplements but does not replace the hand filleters.

Skinning machine

Although in the wet fish packing section and not in the filleting line, mention might be made here of a machine for skinning cod fillets; the fillets are fed on to a rapidly rotating drum with the skin side in contact with the drum's surface; a knife edge separates the flesh from the skin at the tail end and the whole skin is peeled off more neatly and cleanly than it could be done by hand.

Haddock

There are two processing lines for haddock, one for haddock fillets and the other for finnan haddock which are split but not boned. The fillets are dealt with in the same way as for cod on the same filleting line. For finnans, the fish are first opened by women, who split the fish and scrub them under water. The scrubbed fish are then split by a worker who makes a cut down the length of the fish deep enough to expose the backbone without cutting right through; this needs skill, for at the speed at which the splitter works a slight miscalculation will ruin the fish, and it is easy to see why the skill of the splitter is rated higher than that of the cod filleter. Great importance is attached to the appearance of the saleable fish.

Filleting of small fish

It is uneconomical and laborious to fillet small fish, such as small haddock and whiting, by hand, and installed in the filleting line is a machine, made by a Hull company, which will fillet small fish automatically. With it two girls can fillet 600 stones of fish in a day, a quantity which would require 10 men to do by hand.

Herrings

Most of the herrings dealt with by the factory are destined for smoking, to become the familiar kippers. There are two kinds of kipper, one in which the head is retained and the other in which it is removed before kippering. The only reason for the difference is popular taste.

There are two machines for dealing with herrings, depending on the type of kipper desired. One machine cleans, bones, splits, and removes the heads; the other cleans and splits only.

After filleting, the fish can go two separate ways: it is either packed and dispatched as wet fish, or prepared for smoking. Wet fish required for sale is withdrawn from the overhead conveyor when it reaches the packing section; there it is inspected, weighed, and packed in boxes for dispatch. Fish required for smoking is dealt with as described below.

BRINING

Fish which is to be smoked must first be soaked in a brine solution, and the practice is to immerse it in tanks containing an 80% brine solution, to which dye is added according to requirements. Not all smoked fish is

dyed, and whether or not it is depends on the type of fish and the market for which it is intended.

Dyeing of fish before smoking

Fish is dyed simply to make it look appetising. Some fish colours only slightly during the smoking, and if not dyed would be unattractive and unsaleable. Dyeing was introduced before the First World War. Popular taste varies from place to place; fish for the Paris market, for instance (considerable quantities of fish are exported to France), is dyed a much deeper colour than that for the home market. Haddock as a rule is not dyed; the natural pale straw colour of smoked haddock suits popular taste.

Brining

The brining tanks are arranged alongside the filleting line, and are divided into sections for fillets, finnans, and kippers, each section being sited immediately opposite the appropriate section of the filleting line. Thus movement of material not in process is reduced to a minimum. Immersion time in the brine is about 15 min. depending on the size and variety of the fish, after which the fish are drained for about 2 hr. Excess brine would spoil the flavour and surplus moisture during smoking would reduce the efficiency of the smoking process because of the heat wasted in evaporation. The draining racks are on wheels so that when draining is finished, each rack, holding 30 stones of fish, can be wheeled into the smoking kiln.

SMOKING

The kilns

Smoking is done in four Torry-kilns each holding 120 stones of fish in four cabinets. Each kiln operates independently. At the moment the kilns are arranged as follows: two are for fillets, one for finnans and one for kippers. Each kiln has four doors on each side, one for each cabinet; the procedure is to run the trolley racks in from one side and out of the other. At the end of each kiln is a smoke burner comprising six compartments, each of which is

Smoked haddock, after withdrawal from the kilns seen on the right, are being sorted, weighed, and packed.

charged with a layer of wood chips, on top of which is laid a layer of oak sawdust. The layer of chips is lit and the oak dust provides the essential smoke ingredients.

An electric impellor passes the smoke first through a filter to remove solid particles which would spoil the appearance of the product. The effective component of the smoke is not that which is visible but that which is not, so filtration is important. After filtration, the smoke is heated to the operating temperature of the kiln, 85°F., then it passes successively through a distributor, a set of two racks of fish, a reheater to replace the heat lost, then through the other two racks of fish, and finally to the ejector.

In the operation of the kiln three factors are important: the speed of the smoke, its temperature, and the temperature of the smoking cabinet. Insufficient temperature will result in incomplete curing and too much will cause cooking, so the temperature is rigidly controlled by recording thermostats at all points in the kiln. The process carried out in this factory is known as "cold smoking." Depending on the type of fish, the smoking time is from 3 to 4 hr.

Rigid control

The design of these kilns, which was worked out with the Torry research station, enables strict control to be maintained at all stages in the smoking process, and thus a high standard and uniformity of product quality is achieved. The kilns can also be operated regardless of atmospheric conditions, which is not the case with kilns of traditional type. The aim of the smoking process is to produce a well-cured product which has a pleasing appearance, a firm and smooth texture, and which is full of its natural goodness. The kippers, haddock, and cod fillets which we saw after removal from the kilns had these qualities in full.

PACKING AND DISPATCH

After removal from the smoking kilns, the smoked fish are taken to the weighing and packing section nearby to be removed from the racks and packed. Some of the fish for shop sale are wrapped in cellophane before boxing. The packing line is divided into sections which deal with smoked fillets, finnan haddocks, and kippers, corresponding to the appropriate smoking kilns. Before being packed, the fish are inspected, and any having blemishes such as blood

clots or gashes are rejected. These are sold in the cheaper markets.

After receiving their weighed contents the boxes are passed down a conveyor at the end of which operatives tack down the lids and machine wire the boxes. During our visit, an experimental pneumatic tacking machine was being used; by touching the nozzle of a hand-held gun at the place where a tack was required, a ¾ in. tack was instantly driven home. A lid could be tacked completely in seconds.

Vacuum packing

To cater for the quick-frozen market, a Dutch *Awo "Vacumatic"* vacuum-packing machine has been installed, which produces 7 oz. packs in vacuum-sealed transparent plastic containers. This is said to be the first installation of its kind in the fish-processing trade, and although the volume of output packed in this way is not at present large, the growing interest in vacuum-packing will doubtless lead to developments in this line.

Pneumatic communication

Between the sales office and the packing and dispatch sections of the factory there is a system of pneumatic tubes for dispatching orders to the appropriate section of the factory. When the orders have been made up, the invoices are returned to the sales office in the same way. This system eliminates the need for messengers and is typical of the streamlined efficiency of the factory.

(*Right*). An Awo "Vacumatic" packing machine, the first of its kind to be used in the fish processing industry, is used to produce the 7 oz. vacuum packs of kippers and haddock cutlets shown below; these are quick-frozen immediately after packing.

Storage

Besides the cold store already mentioned, which is used for storing wet raw fish before processing, there is a 3,000 stones cold store for holding processed smoked fish before dispatch at 30°F. The two stores are not related.

Between 12 and 15,000 boxes are used every week by the packing sections, and these are stored in two stores, one for kipper boxes and the other for smoked and fresh fish boxes.

Salt for the brining tanks is delivered by road tanker and is stored in a 20 tons salt store which can be charged from the tanker at the rate of a ton per minute. Next to the salt store is the store for wood dust used for smoke generation. At one time an automatic conveyor from the dust store to the smoke kilns was envisaged, but the consumption of dust is so small that no problem is caused by moving it by hand in wheeled bins from the store to the generators.

The new Ross factory at Grimsby typifies a new spirit in the fish industry; new methods are giving way to old, and the emphasis is on a hygienic, reliable, uniform product of attractive appearance and high nutritive value. Standards are rising in every direction, from the super-trawlers now coming from the yards, to the large refrigerated lorries which distribute fish products to all parts of the country. Rarely does one see nowadays open fishmongers' slabs piled high with fish; and the independent filleter who worked at his table in the market ankle-deep in offal has now practically vanished. This country would do well to cherish an industry which supplies high-quality protein in abundant quantity at a price considerably below that of meat.

Many of the Ross fleet of 49 trawlers are modern vessels like the *M.T. Ross Panther*, which cost about £250,000 each and which provide a standard of accommodation for the crews incomparably better than those of a generation ago.

Technology of Smoked Foods

By W. W. Foster,* B.Sc., A.INST.P., PH.D.

The author recently attended an international conference in Poland on the smoking of foods, the emphasis being on fish. Recent advances in the technology of smoking are described, and summaries of some of the papers presented are given at the end. This article was prepared as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.

ON behalf of the Herring Industry Board and the Department of Scientific and Industrial Research the author attended a conference on smoke curing held last year. This was held in the Chemistry Department of the Gdansk Institute of Technology, the chief organiser being Professor D. J. Tilgner, head of the Department of the Technology of Animal Produce. The conference lasted three days, and a further two days were devoted to informal discussions and to official visits. Most of Professor Tilgner's assistants understand English, and a number of them acted as interpreters. Representatives were present from research institutes in Gdansk, Gdynia, Brno, Prague, Moscow, and Aberdeen. The foreigners at the conference were Mr. M. Adam (Prague), Dr. B. Dolezal (Brno), Mr. I. I. Lapshin (Moscow), and the author (Aberdeen). Students from the Gdansk Institute of Technology and representatives from meat and fish processing factories in Poland also attended.

Most of the subjects discussed at the conference will now be described under headings. Summaries of prepared papers are appended. The author did not present a paper, but described some of the work on smoking which has been done in Aberdeen. Some of the papers read at the conference will be published in the Polish monthly "Przemysl Spozywezy." A full account of the proceedings and the original papers will probably appear in the Polish Scientific periodical "Roczniki Chemii i Technologii Zywnosci," published by the Polish Academy of Science.

* Member of the research staff of the Herring Industry Board stationed at Torry Research Station, Aberdeen.

The control panel of one of the smoking kilns at the Ross Group fish processing factory at Grimsby. Instruments measure and control cabinet and smoke temperatures, smoke speed, and time of smoking, the vital factors in the smoking process.

Meat and fish smoking were discussed, but the emphasis was on fish, chiefly herring. Britain is interested mainly in cold smoking of foodstuffs (flesh temperatures up to 30°C.), the Continental and Asiatic countries being primarily concerned with hot smoking (flesh temperatures up to 90°C.).

Opening remarks

The Dean of the Chemistry Faculty of the Gdansk Institute of Technology, Professor Mgr. Inz. Z. Rozmej, formally opened the conference and welcomed foreign guests. In his introductory paper,[1] Professor Tilgner said that smoke was originally used to preserve foodstuffs, the flavour being of secondary importance. Nowadays, the consumer demands a palatable product, and efforts must be directed to this end. Furthermore, what was once a haphazard process must now be closely controlled and this requires an understanding of the basic factors involved. Professor Tilgner called for closer collaboration between establishments working on theoretical and applied research in this field to enhance the rate of progress. His suggestion that symposia on certain defined themes should be held periodically at various research stations was received with enthusiasm.

Wood smoke generators

Everybody felt the need for an easily controllable, reproducible source of smoke, particularly for research. In the industry generally in Poland, as in Britain, heat and smoke are supplied by burning wood beneath the foodstuff, and it is very difficult to control the process. Some Kverner kilns are used in Poland, but it is still difficult to control temperature and smoke density. The author described a fluidiser smoke generator[2] which has been developed in Britain. This aroused considerable interest since in this generator smoke can be produced at any desirable temperature and the chemical composition of the smoke can therefore be controlled.

In Czechoslovakia, a friction smoke generator basically similar to the American model[3] has been developed. Smoke is produced when a block of wood is pressed

against the outer wall of a rapidly rotating cylinder.[4] The density of the smoke produced is constant, increasing only when the pressure on the wood is increased. A small friction generator was demonstrated during the conference; it was not noisy and appeared to give a good output of smoke, the odour of which was similar to that from the fires used with Torry kilns.[5] These friction generators are used in research in Czechoslovakia, Poland, and Russia. The Poles and the Russians are considering using them in their factories. Seven are being used in factories in Czechoslovakia, and a further 40 are to be installed. In Czechoslovakia, where wood sawdust is used in laminated materials and some sawdust must be specially made to supplement the ordinary residues, bulk wood is as cheap as sawdust and the need to use wood blocks in friction generators is therefore not an economic disadvantage. In Poland, where sawdust is much cheaper than bulkwood, consideration is being given to the reconstitution of wooden blocks from sawdust. Although in many places in Britain sawdust is cheaper than bulkwood, in some places, where sawdust is not available locally, bulkwood might be used with economic advantage.

Ordinary and electrostatic smoking kilns

It was generally agreed that kilns without controlled heating, air flow, and smoke generation are obsolete. The Czechs[6] have developed a batch process kiln in which air and smoke are circulated round a chamber at an average velocity of about 1 metre/sec. In conjunction with friction generators, these kilns are becoming standard equipment in Czechoslovakian smoking factories. The Poles at Gdansk are working with a small Torry kiln,[7] and consider that this is a useful basic design for a smoking kiln. At a demonstration by Professor D. J. Tilgner and Mr. M. Pietrzyk,[7] herrings were hot smoked in a small Torry kiln with a working section volume of 0·43 m.^{3} (about 2 ft. 6 in. × 2 ft. × 3 ft. long). By means of thermocouples, the temperatures of the kiln and of the interior of a herring were measured periodically rising from about 30 to 100°C. in about 40 min. Smoking was completed in a much shorter time than that required in traditional vertical kilns. The general opinion was that the flavour of these fish and of sprats smoked before the demonstration was very satisfactory.

Demonstration of electrostatic smoking

Electrostatic smoking is being studied in every country represented at the conference. All countries except Britain are using conventional methods of electrostatic precipitation in which the wood smoke particles are charged and accelerated towards the fish in the same electric field. Mr. Z. Sikorski (Gdansk Institute of Technology), who has published on the subject,[8] demonstrated electrostatic smoking.

Smoke from a friction generator was passed to a smoking chamber containing parallel sets of ionising wires, each set being backed by plates at the same high voltage. Earthed sprats, which were conveyed between the sets of wires, developed adequate colour in three minutes and were cooked in a few minutes. An even distribution of colour on the surface of the fish was ensured by placing the fish 10-20 cm. from each set of ionising wires. The flavour of these sprats was similar to normally smoked sprats, although everyone agreed that, in general, electrically smoked fish tasted a little more acrid (strongly flavoured) than that smoked normally.

A colour film of electrostatic smoking was shown by Mr. M. Adam (Prague). Pieces of meat and sausage were passed through a chamber in an apparatus similar to that shown by Mr. Sikorski. Mr. Adam also gave a paper about electrostatic smoking equipment.[4] Mr. Lapshin said that similar systems are used in Russia; the fish, secured by the tail, are cooked by conveying them between batteries of infra-red lamps.

The author described the space charge method of electrostatic precipitation which has been developed in Aberdeen.[9, 10, 11] In this system, the wood smoke particles are charged in a corona field and are then passed into the chamber containing fish where they precipitate, in the absence of an applied field, by the action of their space charge. This method can be used in continuous or batch-wise processes.

Deposition of wood smoke

The chemical estimation of some compounds of smoke deposited on fish was discussed. The paper on this subject by a Czechoslovakian[12] was read in his absence. Dr. Dolezal[13] and Mr. Adam found that the rate of deposition of wood smoke is greater the higher the relative humidity. The author mentioned that similar results had been found in Aberdeen.[11] The author described recent work in Aberdeen in which it was shown that smoke deposits more rapidly on wet than on dry surfaces, and that the drier the fish, the lower the rate of deposition. These results corroborate those of the Poles and of the Canadians.[15] It was agreed that this effect might partly account for the high rate of deposition at high relative humidities, since in these conditions the fish surface would remain wet during smoking.

The author described physical and chemical work in Aberdeen,[16, 17] which showed that during cold smoking (up to about 30°C.) the visible, tarry particles of wood smoke do not contribute significantly to the deposits on water and fish, except perhaps when the fish is extremely dry. These results can be fairly satisfactorily explained on a theoretical basis.[16] It appears that normal cold smoking is a vapour scrubbing process. Professor N. A. Voskresenskii (Russia)[18] presented a paper on theoretical aspects of hot smoke deposition, but was unable to attend the conference. In his absence it was impossible to have effective discussions of his paper in relation to the work done in Aberdeen.[16, 17]

Although it is well known that some smoked foods contain minute quantities of 3:4 benzpyrene, it does not appear to be certain that they are carcinogenic.[19, 20, 21] Nevertheless, research in Czechoslovakia, Poland, and Russia is being directed towards reducing the chances of introducing possible carcinogens into foods by smoke curing.

Mr. Lapshin[22] has shown that the concentration of 3:4 benzpyrene in smoked fish varied according to the process, and was between 7 and 50 microgrammes per kilogramme of fish. The concentration at the surface was about 10 times greater than that inside. Mr. Müller[23] showed that about equal amounts of 3:4 benzpyrene and 1:2:5:6 dibenzanthracene—another carcinogen—occurred in wood smoke. He considered various ways of reducing the quantity of such carcinogens in smoked foods, but favoured preventing their generation, such as by using lower temperatures in smoke producers like the fluidiser.[2] Recent results showing the overriding importance of wood smoke vapours in cold smoking[16, 17] were discussed since these might have an important bearing on future work.

The Russians are approaching the problem differently—Mr. Lapshin[22] showed that it was possible almost to eliminate 3:4 benzpyrene deposited on fish by using smoke dips instead of direct smoking. The quantity of this carcinogen in treated fish was less than one hundredth of that present in normally smoked fish.

Dipping or immersion processes

The possibility of replacing normal smoking by a dipping and drying process appealed to the Polish trade representatives. Most of the work reported at the conference on this subject was Russian.[22] Wood was burned in a special generator and the smoke was collected in condensers. It was extracted with water and concentrated at 130°C. to a very dark, viscous liquid of density 1·3 g./cm.^{3} The dip, free of 3:4 benzpyrene, was prepared by diluting 6 times with a 5% aqueous salt solution and filtering. After normal brining, whole herrings were dipped or sprayed with the smoke solution for about 2 seconds and conveyed between infra-red lamps for cooking and development of colour and flavour. A demonstration showed that during cooking, the colour of a dipped herring developed whilst that of an undipped fish did not. It was thought by people at the conference that the smoky flavour of the dipped cooked herring, even after a lapse of 24 hr. for the smoke to penetrate, was not quite as strong or as pleasant as that of normally smoked herrings.

Effect of type of wood on smoky flavour

Hitherto in Poland there has been a reluctance to use soft woods for smoking since they are reputed to give poor flavours. Recent work at Gdansk[24] with many types of wood showed that the difference is not sufficiently marked to warrant such a resistance to their use. The author mentioned that although it is commercial tradition to use oak wood, a great deal of fish is smoked in Britain with mixed hard woods, supplemented with, or sometimes replaced by, soft woods. There appears to be no evidence that the consumer reacts unfavourably to the use of soft woods. Dr. Dolezal[13] found that foods smoked with soft woods tasted slightly better than those smoked with hard woods.

Quality assessment and control

Workers in the Gdansk Institute of Technology are endeavouring to rationalise quality assessment of all types of foodstuffs, and have done a considerable amount of valuable pioneer work.[25, 26] The authors of this work hope that these studies will lead to improved methods of quality assessment and the placing of industrial quality standards on a scientific foundation, which is not now the case in many places throughout the world.

Conclusions

The author found a refreshingly friendly atmosphere at the conference, and the participants were very forthcoming in describing their work. The papers presented indicated the valuable work being done in Czechoslovakia, Poland, and Russia on smoke curing and discussions underlined this fact. The vigorous attacks being made on the problems and the new methods devised augur well for the future of smoke curing.

This international conference offered an opportunity, for the first time, for workers in the field of smoke curing to meet. The view was strongly expressed that such meetings were very necessary in order to encourage further the interchange of ideas, and it was urged that there should be an increase in the number of nations participating in future meetings.

Professor Tilgner and his staff are to be congratulated.

ABSTRACTS OF SOME OF THE PAPERS READ

1. Destructive distillation of wood (1)

Prof. Dr. Eng. D. J. Tilgner,
Gdansk Institute of Technology.

Smoke curing considered as a chemical method of preserving has, up to now, been a typically traditional process, which has only begun to show some technological progress during the last quarter of a century.

In some countries up to 40% of the products of the meat industry and 15% of the fish catches are smoke cured. No other process involves so much trial and error and allows so much latitude and which has so few research workers studying its problems.

Research must be directed towards producing a safe, palatable product by the most economical method. More information is required about the amounts of the various smoke constituents deposited on fish and of their effect on quality. This would accelerate interchange of experience and the fixing of industrial standards and ensure better and more uniform products.

The traditional and very wasteful methods of making smoke by fire is considerably inferior to new methods such as the fluidiser and

friction generators, and these should therefore be exploited.

The process of smoke deposition depends on a number of physico-chemical factors, and a more thorough understanding of these will make further progress possible. Among the new methods of transferring smoke components from the ærosols to the product to be smoked, smoke curing in an electric field is particularly important since it lends itself to efficient continuous processing.

2. Smoke generators and electrostatic kilns (4)

Engineer M. Adam,
Research Institute for Mechanisation and Economy of the Food Industry, Prague.

A smoke generator was developed which consists of a rotating serrated cylinder against whose outside surface a block of wood is pressed. Wooden blocks 10 cm. square by 60 cm. long are used. A 5 h.p. motor drives the cylinder at about 1,500 r.p.m. The temperature at the surface of the cylinder, measured by a thermocouple embedded in the wood, and the smoke density, increase with increasing pressure between the wood and the cylinder. The most serious problems were the tendency for fires and the tarring up of the cylinder. After trying various types of serrations, a cylinder with narrow longitudinal slits was adopted. In this system, the friction surfaces are cooled and cleaned by a blast of air passing through the slits.

Various conventional methods of ionising and precipitating wood smoke on foodstuffs were used. In one system ionising wires were backed by plates at the same high voltage, the adjacent foodstuff being earthed; another consisted of parallel plates with ionising points projecting from the surfaces facing the foodstuff; another had ionising points round the edge of the smoke inlet, the smoke from the inlet and the points being directed at the target.

Fish and sausages are smoked in 4-5 min. Sausages are cooked in a further 10-60 min., depending on their size.

3. Comparison of kilns using generated smoke with traditional kilns (6)

Dr. B. Dolezal,
Meat and Fish Research Institute, Brno.

A number of experimental smoke curing operations were made, during which the progress of the process in a generator type and in a traditional type smoking kiln was compared.

The numerical data obtained in the course of these experiments made it possible to draw some conclusions showing that curing in a generator type smoking kiln gives the following advantages: better quality of the smoked meats; higher production yield and labour productivity; greater heat efficiency; and improved hygiene and safety during production and curing.

The data and conclusions quoted show that the use of the generator type smoking kilns is more advantageous in spite of their capital costs.

4. Determination of phenols and aldehydes in smoked meats (12)

Engineer J. Rusz,
Meat and Fish Research Institute, Brno.

The phenol and aldehyde content of smoked meats is one of the criteria by which the degree of their being cured is determined. In this connection the optimum conditions for the determination of phenols and aldehydes in smoked meats have been established. The best results are obtained when phenols and aldehydes are distilled from smoked meat samples in an acid medium.

Gibb's colorimetric method is the most suitable for the determination of phenols in smoke cured products. The Folin—Denis and Fox—Gange methods are less suitable. The aldehydes in smoke cured products should be determined by the Hutschenreuter method. The Eegrive, Romijn, and polarographic methods are less suitable for this purpose.

The determinations of the phenol and aldehyde content show that the phenol content amounts to 0·5-5·0 mg.%, and the aldehyde content varies from traces to 1 mg.%.

5. Smoking in relation to quality and economy (13)

Dr. B. Dolezal,
Meat and Fish Research Institute, Brno.

A comparison was made of the quality of smoked meat products obtained by the following methods:

(*a*) Normal smoke curing in a generator type smoke curing installation.

(*b*) After maturing (maturing: time, 20 min.; temperature, 50°C.; relative humidity, 60%).

(*c*) Smoke curing after cooking in humid air (cooking: time, 15 min.; temperature, 75°C.; relative humidity, 70%).

(*d*) Curing in smoke of increased relative humidity.

(*e*) Control smoking in open fire smoke curing installation.

It has been established that the best quality smoke cured meats were obtained by curing in smoke of increased relative humidity.

6. Theory of smoke curing (18)

Prof. N. A. Voskresenskii,
U.S.S.R. All-Union Scientific Research Institute of Marine Fisheries and Oceanography, Moscow.

The work on smoke curing is reviewed and future lines of enquiry are indicated. A theory of smoke deposition on fish is developed as follows.

The disperse phase of smoke includes single colloidal particles and their aggregates in a solid, semi-liquid, and liquid state. Two hypotheses are made to explain the electro-kinetic character of smoke used for curing.

(*a*) (Concerning the settling on fish of colloidal particles of radius 5.10^{-6}-8.10^{-4} cm.) A colloidal smoke particle possibly consists of a hard core which is charged by adsorbed atmospheric ions, surrounded by a liquid film which may also contain ions. When moving rapidly in air, the film is distorted and a dipole results.

(*b*) (Concerning the settling on fish of aggregates of colloidal particles of radius 8.10^{-4} cm.) When the aggregate is charged by ions of

the dispersing medium it can then settle on the surface of fish.

In natural smoke curing the deposition of smoke is brought about by the following factors:

Smoke condensation. During smoking, especially in the first phase, the fish surface temperature is much lower than that of the smoke. Because of this, water and other substances, included in smoke in the form of vapour and of liquid droplets, settle on the fish surface.

Smoke adsorption. The surface of fish is a micro-electric zone, probably produced by residues of protein molecules. Electrically active smoke particles coming within the range of the micro-electric field of the fish settle on its surface. The settling, on contact, of solid, hard particles of smoke on the sticky surface of the fish, also plays an important part in natural smoking.

The rate at which particles settle on fish in ordinary smoking kilns depends on the diffusion and convection processes occurring in the smoke near the surface of the fish and on the temperature of the surface. Within known limits, the rate of deposition can be found from the Smoluchowski-Einstein relation with Cunningham's correction, and from Fuchs' relation for charged and uncharged particles.

7. Curing with smoke solution and infra-red rays (22)

I. I. Lapshin,
Institute of National Economy, Moscow.

The basic disadvantages of smoking food by burning wood are that the compounds deposited cannot be easily regulated, the process is difficult to mechanise and it is expensive. A dipping process has therefore been devised to replace normal smoking. This work has involved obtaining smoke solutions, investigating accelerated infra-red drying and cooking, studying the chemical changes occurring in fish treated by the new process and developing it to full scale.

Using the products of the gasification of wood, solutions have been made which are almost free of 3 : 4 benzpyrene but which impart to fish a flavour not inferior to normally smoked fish. Whole herrings are brined and either dipped or sprayed for 1-2 sec. and then baked to develop colour and flavour.

It is estimated that processing costs are reduced by 30-50% using this method.

8. Possibilities of elimination of carcinogens from smoke (23)

Mgr. K. Müller,
Gdansk Institute of Technology.

The available literature and work done by the Chair of Technology of Animal Products of the Gdansk Institute of Technology, indicate that smoke used for curing contains 3 : 4 benzpyrene and 1 : 2 : 5 : 6 dibenzanthracene. So far no investigations have been made as to whether it also contains other carcinogenic compounds. It is quite possible that such substances may also be present.

This paper is the first of a series dealing with investigations concerned with the elimination of carcinogenic compounds from smoke used for curing, and from smoked products.

The conclusions reached on the basis of this work are only working hypotheses, the soundness of which will be checked in further work.

These conclusions are:

(*a*) The main factor contributing to the production of carcinogenic substances during the destructive distillation of wood is the too high temperature at which the smoke is generated. The generation of smoke at a temperature below 300°C. in the decomposition micro-zone of the wood should prevent the formation of the above-mentioned compounds.

(*b*) Neither the oxidation of the smoke components nor the use of high frequency electric fields ensures the effective lowering of the content of carcinogenic compounds in smoke used for curing under industrial conditions.

(*c*) It seems that by using electric-filters directly in the smoke generator, it may be possible to eliminate almost entirely the above-mentioned components from the smoke used for curing.

(*d*) The condensation of the smoke used for curing and its redistillation at a temperature not exceeding 200°C. should make it possible to obtain smoked products which would contain no carcinogenic substances.

(*e*) The cheapest and most effective method of eliminating the above-mentioned compounds from the smoke is the method in para. 1.

9 Analysis and use of smoke from various kinds of wood (24)

Prof. Dr. Eng. D. J. Tilgner and Mgr. W. Wierzbicka,
Gdansk Institute of Technology.

The view still prevails in smoke curing practice that only hard and semi-hard types of wood can be used for producing smoke. The woods actually used are beech, oak, alder, birch, ash, and maple. Those who hold these views believe that curing in smoke from conifers (with the exception of juniper) is not permissible.

It is on account of these views that colossal quantities of valuable varieties of wood such as oak, beech, and others are squandered in our home smoke curing industry, where the wood is more often than not also used for the production of heat.

Under the influence of Sidgway's work, in which he obtained good results with conifer woods, it was decided to investigate the suitability of our own soft woods (pine, fir, aspen) and to compare the results with those obtained by curing with smoke from semi-hard wood (juniper, alder, birch, lime) and from hard wood (beech, oak).

Experiments made with hot smoke cured herrings in a "Torry" type smoke curing plant showed that the best products were obtained by using beech, oak, and maple wood (which are equivalent). By curing in smoke from pine and birch woods, products almost as good as the above were obtained. The quality of smoked herrings was decidedly inferior when alder and lime woods (both equivalent) and also when aspen and fir were used.

The quality of sprats cured in

pine wood smoke was slightly better than that of sprats cured in beech wood smoke.

Present methods of chemical analysis of smoke yielded no definite indications as to the connection between the general quality of the smoked products and the chemical composition of the smoke.

10. Objective indices of quality (26)

Prof. Dr. Eng. D. J. Tilgner and Mgr. N. Barylko-Piekielna,
Gdansk Institute of Techology.

The assessment of the quality of smoke-cured products, as made up to now, is far from being exact, and uses a descriptive terminology and an arbitrary system of marks. The various descriptive terms which characterise the colour, flavour, consistency, succulence, and other indices, are not exactly defined and allow of a subjective interpretation.

It has been ascertained that objective indices of the quality of smoke cured products based on a progressive sensory analysis, can be established. It is necessary to establish for all degrees of intensity of these indices either corresponding standards, which would serve as guides for the assessor, or limit values, based on measurements with appropriate apparatus. It will thus be possible to reproduce the results and to compare the data, independently of where, by whom, and when the assessment is made.

Reference standards have been established for the following:

Colour (as regards its intensity and shade).
Gloss (Richter index).
Smell (5 degree index of smoke smell, and index of its dilution).
Consistency (by means of the penetrometric method).
Succulence (quantity of exudation under a determined pressure).
Taste (dilution index and an outline of taste indices).
Organoleptic saltiness (index of saltiness).

By means of the above method tentative values were established, as an example, in the case of hot smoked fish.

By basing the method of assessing the quality of the finished products on measurable quantities, the research methods have acquired objective criteria for comparison. These make it possible to compare the influence of various processing methods, *e.g.* of the static and the air current or the electrostatic smoke curing methods, and of various smoke generating methods, etc.

The above makes it possible to assess the quality objectively, and to establish a uniform technical control suitable for checking, as well as to ensure that the consumer receives goods of a uniform and measurable quality.

REFERENCES

1. D. J. Tilgner. "Problems regarding the destructive distillation of wood in relation to the technology of smoke curing of animal produce."
2. D. L. Nicol. 1954, British Patent Application No. 26641/54.
3. *Food Engnr.*, 1956, **28** (6), 65, 151.
4. M. Adam. "Problems of smoke curing and construction of electrostatic kilns."
5. C. L. Cutting. Dep. Sci. Industr. Res., Lond., Food Investig. Lft. No. 10, 1950.
6. B. Dolezal. "Comparison of kilns using external smoke generators with traditional kilns using internal fires."
7. D. J. Tilgner. FOOD MANUFACTURE, 1957, **32** (8), 365.
   D. J. Tilgner and M. Pietrzyk, *Przem. Spozyw.*, 1956, **10**, 461.
8. Z. Sikorski. *Przem. Spozyw.*, 1956, **10**, 370.
9. Dep. Sci. Industr. Res., Lond., Food Investig Bd. Rept., 1954, 41; 1955, 30; 1956, 16.
10. W. W. Foster and A. C. Jason. 1954, British Patent Application No. 24329/54.
11. W. W. Foster. 1956, British Patent Application No. 12726/56.
12. J. Rusz. "Determination of phenols and aldehydes in smoked meats."
13. B. Dolezal. "Influence of various conditions of smoke curing on the quality of smoke cured products. An assessment of the smoke curing process from the point of view of economy."
14. D. Campbell and J. M. Shewan. Unpublished result, 1948.
15. E. P. Linton and H. V. French. *J. Fish. Res. Bd. Can.*, 1942-46, **6**, 338.
16. W. W. Foster. 1957, Ph.D. thesis, University of Aberdeen.
17. W. W. Foster and T. H. Simpson. Unpublished results.
18. N. A. Voskresenskii. "Basic theoretical assumptions of the natural and electrostatic hot smoke curing of fish."
19. M. Dobes, K. Hopp and J. Sula. *Ceskoslav. Onkol.*, 1954, **1**, 254.
20. H. Keller and R. H. Heidtmann. *Fleischwirtsch.*, 1955, **7**, 502.
21. E. A. Wojtelowicz, P. P. Dikusz, L. J. Dymorskij and L. M. Szobod. *Woprosy Onkologii*, 1957, **3**, 351.
22. I. I. Lapshin. "Hot smoke curing of fish using smoke solution and infra-red rays."
23. K. Müller. "The hypothetical possibilities of eliminating carcinogenic components from smoke used in curing."
24. D. J. Tilgner and W. Wierzbicka. "Analysis of the products of the destructive distillation of various kinds of wood and their suitability for smoke curing."
25. D. J. Tilgner. "Analiza Organoleptyczna Zywnosci" (Organoleptic analysis of foods), Warsaw, 1957, Wydawnictwo Przemyslu Lekkiego i Spozywczego.
26. D. J. Tilgner and N. Barylko-Piekielna. "The possibility of establishing objective indices of the quality of smoke cured products."

Our Eating Habits

SOME surprising information emerges from the report of a survey carried out by the Market Research Division of W. S. Crawford, Ltd.* For example, six out of ten workers in this country go home for their mid-day meal (the countless numbers of commutors of London and other big cities who travel daily some distance to work are shown to be untypical of the general population); the average daily consumption of tea *per capita* is 5¾ cups; and coffee, that staple beverage of the Continent and North America, makes an utterly insignificant contribution to the British breakfast. The report summarises the results of an inquiry carried out during an August week of 1955 and a February week of 1956; it tabulates the replies of 4,557 adults drawn from every region, age-group, and social class. The information is presented under seven separate meal-groupings.

While the tables are comprehensive, much additional information is available as a result of the survey which does not appear in the book, and those actively pursuing individual researches are invited to apply for further information to W. S. Crawford, Ltd., 233, High Holborn, London, W.C.1. Where the replies involve further cross-tabulation, there will be a small charge for this service.

* *The Foods We Eat.* Edited by Geoffrey C. Warren. A Survey by the Market Research Division of W. S. Crawford, Ltd. Cassell, London. 1958. Pp. 192. 21s. net.

Production of Lyons Maid ice cream at Bridge Park, Middx. (*Left*) A packed carton passing an electronic counter. (*Right*) A view of the mixing plant showing control panel, pasteuriser, weighbridge and filters.

ICE CREAM

By Eric L. E. Humphriss, A.R.I.C., M.I.Biol.

Confusion caused by present legislation ★ Additives ★ Measurement of body and texture ★ Methylene Blue test ★ Nutrition controversies

THE ice cream industry appears to be in a phase of all-round expansion, a process which is by no means finished. Whilst two trade organisations coexist, both incidentally operating amongst other things information services for their members, one must infer that the industry, to some extent, speaks with two voices not necessarily always in unison. Is this a good thing at this stage in the development of the food industry? Or would not the fusion of the two trade organisations into one, representative of the ice cream industry as a whole, be a good thing for everyone concerned? It should be possible to reconcile the interests of the "big" and the "not so big" producers within the ice cream field.

It may well be that such a fusion would prove an advantage when representations are made to government departments regarding such matters as the proposed revised Chemical Standards for ice cream, methods of bacteriological control, and similar topics which concern each member of the trade. This notion is not new, it has been mooted and apparently ignored before; perhaps we cannot afford to pursue a course of masterly inactivity in this connection much longer.

Confusion caused by present legislation

The proposed new Chemical Standards recognise a dairy ice cream in which all the fat is milk (butter) fat with a minimum of 5%. This minimum figure is too low, and as the writer can state from personal knowledge, is already causing confusion amongst at any rate some of the smaller ice cream makers. These people imagine that some sort of twin virtues reside in 5% and *milk fat*, and that if they make an ice cream containing 5% or so of milk fat, using cream, then their product must be a superior one. When such an ice cream is assessed organoleptically against a 10% or 12% vegetable fat product the comparison is, of course, disappointing, even devastating, to the low fat dairy ice cream maker. Surely the sensible thing would have been to raise the minimum milk fat requirement in dairy ice cream to 10%. This would have established, on sight, that the ingredient cost of dairy ice cream of comparable palatability must be considerably increased compared with present day ice cream, and so have avoided the prevalent misconception that there is technical magic in the use of milk fat.

Although the control of overrun is shelved, for the time being, it could be that further study of this problem, in conjunction with the dairy ice cream project, would provide a means of adjusting, to some extent, the ingredient cost disparity which at the moment, operates against genuine dairy product ice cream.

Taking into consideration the other revisions advised in the Report[1] in question, it does seem to the writer that we are in danger of having a multiplicity

of standards, definitions, and titles which, in the long run, may well confuse the consumer—to the detriment of sales. The pros and cons of this subject have been recently discussed more fully elsewhere.[2]

One re-read with interest the chemical composition of ice cream as given by McCance and Widdowson[3] in the Medical Research Council Report, Second Edition, published in 1946. The data they gave, based on their analysis of "three varieties of ice cream bricks," was:

	%
Fat	13·20
Protein	3·90
Available carbohydrate (as invert sugar)	17·50
Water	62·80
Therefore total solids =	37·20

This prompts the question as to whether or not, in spite of the legislation, we have progressed far in the last decade or so.

Additives

The Food Standards Advisory Committee Report on the use of Emulsifiers and Stabilisers in Food[4] probably retarded developmental work on the use of the newer surface active compounds as emulsifying agents in ice cream. There is no question that any additive to food must be known and shown to be free from toxic and carcinogenic effects. To establish the harmlessness of "new" organic compounds is a tedious and exacting business which should be considerably simplified and standardised by the recently published Report of the World Health Organisation entitled *Procedures for the testing of intentional additives to establish their safety in use*.[5]

The employment of synthetic sweetening agents in foods has also come under restriction recently.[6] Ice lollies apart, probably the only impact these restrictions might have on the ice cream manufacturers is in the case of a product specially produced for diabetics.

The permitted antioxidants[7] may now be encountered in, though not added to, ice cream, since anhydrous edible oils and fats, vitamin concentrates, butter used for manufacturing purposes, and essential oils, may all be protected against oxidative rancidity with the listed antioxidants in the prescribed doses.

The writer has come across gelatines recently which are stated to resist microbial decomposition. Whilst not claiming any special knowledge of how this property is conferred on the gelatines in question, it would appear that some imported grades of gelatin have been suspected of containing ethylene glycol dibromacetate, a powerful inhibitory agent, which however is *not* a permitted food additive in this country. There are, of course, other ways of achieving the keeping qualities of a gelatin, and no doubt purchasers of gelatin for use in ice cream will experience no difficulty in obtaining the necessary assurances from their suppliers. This resistance to microbiological spoilage in a gelatin is in any case of little consequence to ice cream manufacturers.

Measurement of body and texture

An instrument originally developed by J. H. Prentice at the National Institute for Research in Dairying and now being applied to the measurement of the rheological properties of a wide range of food products, is potentially of interest to ice cream technologists. If it could be modified by, for example, the application of controlled refrigeration in such a way as to measure the rheological properties of ice cream and so provide an objective method of assessing such important properties as body and texture, hitherto appraised only by subjective means, then a most valuable scientific tool would have been placed in the hands of the technical personnel of the industry.

In spite of attempts, principally in America, over the years, to correlate texture, body, etc., of the finished ice cream with mix viscosity, surface tension, internal cohesion (a concept of the late H. H. Sommer), and so on, nothing of use has emerged. Nor have the heroic attempts at measuring ice crystal magnitude, using a microscope in the cold room, really provided a practicable method of gauging these important organoleptic properties of ice cream as consumed. The availability of some sort of reliable instrument which will do just this is therefore long overdue.

Methylene Blue test

The Modified Methylene Blue test still persists as the most popular semi-official method of assessing the bacteriological quality of ice cream. Many scientists within the industry consider this to be regrettable for cogent reasons and on factual data which have been ventilated and published from time to time, to no avail. For example, most people competent to express an opinion cannot see the logic of measuring the reducing properties of a diluted sample of ice cream after 17 hr. incubation at 20°C. Nor surely can a lax grading system which, in effect, allows the ice cream maker to claim that he is "permitted" one or two Grade III's in the course of a season, be regarded as a useful implement to improve the hygienic quality of the product.

By all means check samples for the presence of salmonellæ, coagulase positive staphylococci, fæcal coli, and streptococci—most routine control laboratories operated by ice cream manufacturers do this anyway—but why abandon the colony count and presumptive coli tests, imperfect though they may be, for an even less precise, exact, and useful method, *e.g.* the Methylene Blue test?

After all, the Public Health Officer, the manufacturer, and the consumer are concerned with the wholesomeness of the product as eaten, and not after incubation for three-quarters of a day at warm room temperature.

All ice cream manufacturers are doubtless by now familiar with the colouring matters in food regula-

Part of the central control panel at Bridge Park. All photographs are by courtesy of the Audley Engineering Co. Ltd., who supplied much of the equipment of this new Lyons automatic factory.

tions; little or no difficulty was anticipated or realised as far as ice cream or lolly production is concerned.

Nutrition controversies

From private sources one learns that the response on the part of the public to the dairy product ice creams marketed by, at any rate, the larger companies is decidedly encouraging. It is even rumoured that the Milk Marketing Board is, itself, seriously considering the prospect of entering the ice cream industry on its own account. Whether or not this will prove to be a popular development remains to be seen. What is certainly less contentious is the undesirability of making rash, extravagant statements deprecating the quality of present-day ice cream. Such utterances have been made, and have achieved an unmerited degree of publicity; they can only do harm to the ice cream trade as a whole, and reflect little credit on their sponsors. Moreover, on any reasoned, unbiassed, factual assessment of the subject they are untrue. No product which admittedly contains more casein, lactalbumin, calcium, and phosphorus (all derived from milk) than does full cream fresh milk, can be rationally described as "rubbish." On the contrary, present-day ice cream is a valuable foodstuff, even if the fat it contains comes from the vegetable rather than the animal kingdom. And there is a not inconsiderable body of expert medical opinion which would regard this as "therapeutically desirable."

However, as stated above, controversy of this sort can do little good, and views on the relative merits of animal and vegetable fats in human nutrition, a very serious subject in its present implications, should be left to be expressed by those eminent medical specialists whose advice is authoritative and based on experience and research.

Such, then, is the general picture presented by the ice cream industry today. The past year has produced nothing novel or new, except a meteorologically poor summer season, which surely cannot be repeated in 1959.

REFERENCES

1. Food Standards Committee Report on Ice Cream Standard. *H.M.S.O.*, 1957.
2. E. L. E. Humphriss. The Dairy Ice Cream Controversy. *Dairy Ind.*, 1958, **23** (9), 644.
3. R. A. McCance and E. M. Widdowson. Chemical Composition of Foods. *H.M.S.O.*, 1946.
4. Food Standards Committee Report on Emulsifying and Stabilising Agents. *H.M.S.O.*, 1956.
5. Technical Report Series No. 144. World Health Organisation. Geneva, 1958.
6. Artificial Sweeteners in Food Order. S.I. 1953, No. 1311. 1953.
7. Antioxidants. Food Standards Committee Report. *H.M.S.O.*, 1954.

An Illustrated Guide to Mushrooms

It is popular practice to divide the higher fungi into two groups—mushrooms and toadstools, the former being edible and the latter either poisonous or unsuitable for eating. Actually no such sharp distinction is possible. In this book,* Pilat uses 22 expressions to describe the gastronomic or poisonous qualities of some 150 varieties of mushrooms. These range from "excellent edible" for *Marasmius oreades* (Fairy Ring) to "fatally poisonous" for the deadly *Amanita phalloides*, the innocuous-looking Death Cap mushroom, which can so easily be mistaken for that tasty field and orchard mushroom, *Agaricus arvensis*, the so-called Horse Mushroom, which Pilat considers to be "the best of all champignons." In between, there are many species which, though not directly poisonous, taste acrid or bitter, or are otherwise unpleasant.

Perhaps the most interesting fact that emerges from this work is that the gathering of wild mushrooms is a considerable industry in Czechoslovakia, where mushroomers are guided by the *Codex alimentarius* of 1937, which lists 58 species of mushrooms which it is permitted to market in that country. Furthermore, their operations are controlled by a Ministry of Health Regulation, No. 586 of 1950, which defines the conditions under which mushrooms may be collected, preserved, marketed, or converted into manufactured products.

The supreme value of the book lies in the excellence of the water colours by Usak and the detailed, concise, and yet exhaustive descriptions of each species by Pilat, which taken together will prevent the "amateur" mushroomer and even the expert from making unfortunate mistakes. These delightful paintings of the fresh living material, in various stages of growth, took six years to produce and are a triumph of patience, enthusiasm, and good team-work between the mycologist and the artist.

F. C. Cooke.†

* *Mushrooms.* By A. Pilat. Pp. 340, with 120 plates in colour by O. Usak. London. Spring Books. 1958. 50s.

† F. C. Cooke is the Editor of "World Crops"—a Leonard Hill publication.

The Problem of Improving Nutritive Value

With Special Reference to the Enrichment of Foods—6

By E. Menden and H. D. Cremer*

In Part 6 of this article, the authors comment on food suitable for enrichment and the technical problems of the process. They examine legislation and current practice in various countries.

(c) FOODS SUITABLE FOR ENRICHMENT

1. Bread

THE enrichment of flour and bread has been undertaken, in many countries, either on a voluntary or on a compulsory basis for many years past. The following review will give the kinds and the amounts of the additives used (Tables 1, 2 and 3). Suggestions concerning the enrichment of flour and bread in Germany, collected from various sources, have been compiled and are here included (Tables 4 and 5). Later, the technical problems of enrichment will be discussed.

Table 1. Vitamins

Recommended supplements for the enrichment of low-extraction wheat-flour in various countries (less than 80% extraction)

Country	Supplements per kilo of flour: Vitamin B_1 mg.	Vitamin B_2 mg.	Nicotinic acid mg.	Vitamin D I.U.	References
Brazil (Sao Paulo) ...	4·50	2·50	nil	nil	(135)
Canada	4·18	2·42	3·44	nil	(135, 165, 278)
Chile	4·30	1·30	13·00	nil	(135, 279)
Denmark	5·00	5·00	nil	nil	(53)
England (patent flour)	1·82	nil	8·64	nil	(134, 163)
(white flour 70%)	1·65	nil	7·85	nil	
Sweden*	2·60—4·00	1·20	23·00—40·00	nil	(135, 165)
U.S.A.	4·18	2·42—2·53	30·14—30·44	550—2,200	(133, 134, 157, 165)

* *the addition of the vitamin varies with the extraction rate.*

Table 2. Minerals

Recommended supplements for the enrichment of low-extraction wheat-flour in various countries (less than 80% extraction)

Country	Supplements per kilo of flour: Calcium mg.	Iron mg.	References
Brazil (Sao Paulo)	2,500(1)	30(2)	(135)
Canada	1,250(3)	26·4-36·8	(135, 144, 278)
Chile	11(1, 8)	13·2(2)	(135, 279)
Denmark	2,000(4)	30(2)	(53, 134)
England	1,200(7)	7·7(9)	(53)
Sweden	nil	30(5)	(135, 165)
U.S.A.	1,250(6)	26·4-36·3(5)	(133, 135, 144, 157, 165, 280, 284, 299, 305)

(1) as $Ca_3(PO_4)_2$; (2) as "ferrum redactum"; (3) as $CaCO_3$ or as "edible bonemeal"; (4) as $CaCO_3$; (5) as iron sulphate; (6) as $CaHPO_4.2H_2O$; $CaSO_4$, or $CaCO_3$, can also be used; (7) as "creta praeparata" (2·35-3·9 grams per kilo); (8) this supplementation is not for nutritional (physiological) reasons, but only to ensure that the mixture of the vitamins is "free-flowing"; (9) patent flour only.

Technical problems of enrichment

The addition of the elements of enrichment to flour can be made either in the mill or in the bakery.

When the mixing is done in the mill the selected food factors for the larger amounts of flour (for example for 1,000 kilos) are first thoroughly mixed with 5 kilos of flour. The preparation of this "pre-mix" presents no difficulty because a number of suppliers to the trade offer various types of mixing equipment which ensure the production of completely homogeneous mixtures.[165] The addition of the "pre-mix" to the main flour bulk follows,† another specially designed mixing and feeding device being used.[165] Continuous enrichment—using either adjustable equipment (the so-called continuous mixer) or "spray-systems" (which are also used for mixing other processing ingredients into flour)—is best.[285]

It is sufficient that the quantities of "pre-mix" flowing from the "feeder" are in fixed proportion to the flour to be enriched;[165, 285] but frequent checking of the filling, the smooth action and the proper adjustment of the mixing device, possibly accompanied by analytical control and examination under ultra-violet light, fully assure the uniform distribution of the elements of enrichment throughout the flour. "Enrichment tablets"[165] or "enrichment wafers"[14] are used in the bakery to add the elements of enrichment; these tablets contain, in a compressed form, the additives necessary to enrich a fixed amount of flour. They are usually provided scored so that they may be used with smaller amounts of flour.[165] The addition is made by first dissolving the tablet in some of the water used to prepare the

* Director, Institute of Nutritional Science, Justus Liebig University, Giesen.

† Prepared "pre-mixes" are commercially available; these are added to flour at levels of 156 grams or 312 grams per ton. Even with such relatively small amounts homogeneous mixtures are easily obtained.

Table 3. Natural Products as Combinations of Various Food Factors

Recommended supplements for the enrichment of low-extraction wheat-flour in the U.S.A. (less than 80% extraction)

Supplements per kilo of flour			
Dried yeast	*Skim milk powder*	*Soya*	*Grain-germ*
g.	*g.*	*g.*	*g.*
15·0-20·0	to 60·0	5·0	to 50·0

References (140, 142, 157, 249, 265, 280)

The use of skim milk powder, and of grain-germ, is widely practised in many countries, particularly for the production of special breads.

In addition to the countries named in the tables above, Belgium, Switzerland and Australia carry out flour and bread enrichment on a large scale. In Central America flour and bread enrichment is compulsory; in El Salvador and Panama, and in the other Latin American countries, flour and bread enrichment is permitted, although in most cases no official enrichment formula has been established. In this connection it may be mentioned that a few mills in Colombia and Peru customarily enrich their flour.

Table 4. Vitamins and Minerals

Suggestions for the enrichment of flour and bread in Germany (for rye or wheat-flour of an extraction rate under 80%)

Supplements per kilo of flour					
Vitamin B_1	*Vitamin B_2*	*Nicotinic acid*	*Calcium*	*Iron*	*References*
mg.	*mg.*	*mg.*	*mg.*	*mg.*	
.	.	.	2,140(1)	.	(45)
.	.	.	+	.	(62)
4·5	.	.	.	.	(143)
.	.	.	720(2)	.	(180)
+	.	+	.	.	(282)
—	+	.	.	.	(27, 47, 137)
.	.	.	.	.	(6)
4·0	2·0	30	1,250	26·4	(161[3])
4·2—	2·2—	32—	1,100	30·0	(23, 33, 145, 283)
3·0	1·5	20	.	.	(254)

+ = *supplementation suggested, but no level given.*

(1) as $CaCO_3$; (2) as $CaCO_3$ (already practised in the British Zone in Germany); (3) enrichment of wholemeal bread also.

dough.[165, 286] Similarly, "enrichment wafers" also contain the additives necessary for enrichment in a compact form; these are used, after they have been allowed to disintegrate in water, by working into the dough the suspension which is obtained. However, this method of enrichment is becoming rare.[144]

Comparisons between the various methods of enrichment described have shown that mixing in the mill is considerably better if the supply of enriched bread for large groups of the population is to be secured. Enrichment in the bakery leaves too much to individual initiative, and it is difficult to control. Where compulsory measures of enrichment have been adopted, therefore, mixture in the mill is usually preferred to mixture in the bakery.[53, 62, 278]

Attention must be paid not only to the uniform distribution of the elements of enrichment in the flour, but also to the influence on the flavour and the quality of the bread which the enrichment process may have; stability in storage, in the preparation of the dough and during the baking process is also essential.[120, 241] (These problems have already been discussed in the review of the individual food factors.)

The Enrichment of Bread: A Comparison between the Nutritive Value of Wholemeal Bread and of "Enriched Bread" from Finer Flour.

Ever since the turn of the century, a growing preference for white bread and low-extraction flour has become established. This type of flour and bread, without doubt, offers a number of advantages when it is compared with wholemeal bread or bread made from high-extraction flour. Its use shows a better utilisation of protein and of calcium; it is easier to digest (and therefore easier to assimilate); and it stores better than wholemeal bread.[17, 68, 108, 174, 176, 178, 179] Nevertheless, this development has concealed great dangers, because food factors vital to life are removed from the grain by the extraction process. Thus, animal experiments have proved invariably that white flour, and bread of low-extraction flour, do not produce the growth obtained with wholemeal flour or wholemeal bread.[74, 175, 287] Vitamin deficiencies are, primarily, responsible for this.[175]

Similarly, an inadequate supply of essential nutrients, particularly of vitamins, must inevitably occur (in Germany today) because of the high proportion of grain-products in the diet of the people.

An ideal way of removing these deficiencies would seem to lie in increasing the proportion of wholemeal bread in the total amount of bread consumed.[17, 84, 110, 288] Attempts have been made to increase the sales of dark bread by propaganda, but this met with no success with the average consumer.

Today, it seems questionable whether a universal change to wholemeal bread would, indeed, be the answer.[289] Because of the greater yield of flour, bran is lost as a separate food substance—bran which is only poorly utilised by humans. If the utilisation by man of the meat and the fat obtained from well-fed animals is compared with that of bran, it is clear that the use of bran in fodder is much more desirable both economically and nutritionally.[71, 290, 291, 292] Some revision must also be made regarding the general concept of the absorption of vitamin B_1 from wholemeal, bran and high-extraction flour, as well as from the breads made with them;[23] from the 4·5 mg. of vitamin B_1 which is contained in a kilo of wheat or rye an average of only 50% is absorbed; the vitamin enclosed in the fibrous layers is extracted only with difficulty in the gastro-intestinal tract.[145] A positive balance of vitamin B_1 in humans is therefore possible from the consumption of wholewheat or

whole rye bread only with limitations.

From our present knowledge of nutritional physiology, an effective improvement in the supply of the essential nutrients to large groups is already attainable. The benefits, and the amounts, of the individual supplements, and whether these should be present as pure food factors or as natural products taken as combinations of food factors, must all be decided for every individual case. However, no doubt remains, after a long series of experiments in comparing the nutritive value of ordinary bread, wholemeal bread and enriched bread, that fully enriched bread is superior to all other types of bread.[41, 198, 293-299] A vitamin- and mineral-enriched white bread, made according to normal U.S. standards produced in rats an average increase in weight of 95 g. within 8 weeks. The increase in weight from wholemeal bread was 82 g.; from "milk bread" 20 g.; and from black bread 15 g. No increase in weight at all was established from unenriched white bread.[295] Furthermore, the addition of a combination of skim milk powder, dried yeast and soya flour to ordinary bread improved its biological value when this was compared with that of wholemeal bread or bread made from high-extraction flours.[198] The fact that a supplement of milk, by itself, is not sufficient to raise the biological value to that of wholemeal bread [295] stresses the importance, from considerations of proper nutrition, of careful selection of the elements used in enrichment. The best possible effects are to be obtained only by a sensible combination of all the necessary food factors.

In this connection, a "vitamin-bread experiment" conducted by the English with German children, in 1947-48, must not be left unmentioned. Comparative experiments were made with two groups each of over 100 children, using wholewheat bread, bread made from 70% extraction wheat flour, and bread made from vitamin-enriched wheat flour. In the whole diet, 75% of the calories came from bread, 15% from soups and vegetables, 6% from potatoes and 4% from milk or other nutrients of animal origin. No differences in the rate of growth, or in the states of health, were established.[300] These results rather contradict all the previously published reports on the beneficial effects of enrichment. However, it is to be concluded from subsequent reviews of the work[301]—indeed, from the observations of the leader of the experiment himself [300]—that the findings of this experiment cannot be given general application. It was not possible for the supplement of vitamin B_1 to show effective results because, besides the bread, the general diet was comparatively rich in B_1; even the "light" flour used showed an unusually high B_1 content.

Moreover, it cannot be ignored that the children were considerably undernourished at the beginning of the experiment; under such conditions, the observation period of one year was too short to be able to establish responses from levels of vitamin B_1 only slightly different one from another.

Table 5. Natural Products as Combinations of Various Food Factors

Suggestions for the enrichment of flour and bread in Germany (for rye or wheat-flour of an extraction rate under 80%)

Supplements per kilo of flour				
Dried yeast	*Skim milk powder*	*Soya*	*Wheat germ*	*References*
g.	g.	g.	g.	
.	.	+	.	(259)
.	.	.		(284)
–	.	+	.	(228)
5·0	12·5	12·5	.	(198[1])
–	.	.	.	(203)
.	15·0	15·0	.	(62[1])
.	.	.	100[2]	(272)
.	.	.	–	(282)
.	.	+	.	(258)
.	+	.	.	(47)
–	.	.	.	(230)
.	.	100[3]	.	(266)
–[4]	.	.	.	(145)
.	25-30[5]	.	.	(254)

+ = supplementation suggested, but no level given.

(1) the selected natural products to be added as a mixture; (2) limited by the fact that the amount of grain-germs necessary is not available; (3) in dietetic bread; (4) limited by the fact that the amount of yeast necessary is not available; (5) acidulated skim milk powder.

Table 6. Vitamin Supplements to Margarine in Different Countries[135, 144]

Country	*Supplements per kilo of margarine[45]*	
	Vitamin A, I.U.	*Vitamin D, I.U.*
Brazil	15,000-50,000	500-2,000
Denmark	20,000[1]	625
England	27,000-33,000[3]	2,900-3,500[5]
Germany	20,000	100
Holland	22,000	1,000
India	24,640[4]	nil
Norway	20,000	2,500
Sweden	30,000[2]	1,500
Switzerland	34,000[3]	nil[3]
U.S.A.	33,000	no level specified

(1) of which 6,000 I.U. are present as beta-carotene; (2) of which 5,000 I.U. were formerly present as beta-carotene; of late only vitamin A may be present; (3) according to the new levels for the vitamins issued by the Public Health Department of the Swiss Confederation, a "vitaminised margarine" in Switzerland must contain at least 34,000 I.U. of vitamin A per kilo; three times this amount of vitamin A is required if the statement "rich in vitamin A" is made. A vitamin D claim is allowed if the margarine contains 3,000 I.U. per kilo; three times this amount is required if the statement "rich in vitamin D" is made; (4) this vitamin supplementation in India is in "vanaspati." (5) the law requires that margarine must contain: Vit. A = 760 – 940 I.U./oz., Vit. D = 80 – 100 I.U./oz. The addition of the vitamin to margarine is a comparatively easy technical operation; the oily vitamin solution or concentrate is added to the emulsion at the lowest temperature possible in the manufacturing process, and shortly before further processing. As a general rule, the addition should be made just before the final intimate mixing of the separate ingredients.[136]

Table 7. The Enrichment of Milk with Vitamin D in Different Countries[135, 282]

Country	Vitamin D per litre I.U.	Type of Milk
Germany[1]	750-1,000	For "infants' milk" (and also condensed milk)
England[2]	1,000 (= 10,000 per kilo of dried milk)	Milk powder
Sweden[2]	450 (= 4,000 per kilo of dried milk)	Fresh milk in winter Milk powder
U.S.A.[1]	400	Homogenised fresh milk; condensed milks

(1) the method of enrichment is either by ultraviolet irradiation or by supplementation with vitamin D solutions; (2) the method of enrichment is by supplementation with vitamin D solutions only.

Table 8. The Enrichment of Foods and Beverages other than the Common "Staple Foods"[1]

Description	Supplements per 100 grams	References
Biscuits ("crackers")	Dried yeast: 1·5 g. in 100 g. of flour; the yeast should contain 60 mg. vitamin B_1, 60 mg. vitamin B_2, and 100 mg. of nicotinic acid in every 100 g.	(247)
Fruit drinks (as powder)	Vitamin C: 715 mg.	(158)
Coffee (the soluble extract)	Vitamin C: 200-400 mg.	(158)
Cocoa	Vitamin C: 53 mg.	(158)
"Combat Rations" (U.S. Army)	Vitamin A (+); vitamin B_1 (+); Vitamin C (+); dried yeast: up to 3 g.	(101, 246)
Canned goods (vegetables)	Vitamin C: (+)	(136, 281)
Chocolate	Vitamin A: 8,000 I.U.; vitamin D: 800 I.U.; vitamin B_1: 0·42-2·0 mg.; vitamin B_2: 4·0 mg.; nicotinic acid: 20·0 mg.; vitamin C: 60·0 mg.	(151, 152, 158)
Table salt	Potassium iodide: 2-20 mg.	(10, 56, 59)
Dehydrated, pre-cooked, soups	Vitamin B_1: 1·17 mg.; dried yeast: up to 3 g.	(158, 246)
Tea (the soluble extract)	Vitamin C: 938 mg.	(158)
Flour paste products (such as macaroni)	Vitamin B_1: 0·9-1·1 mg.; vitamin B_2: 0·3-0·5 mg.; nicotinic acid: 6·0-7·5 mg.; iron: 2·9-3·6 mg.; calcium: 290 mg.	(140, 144)
Drinking water	Fluorine: 0·1 mg.	(11, 58)
Sugar products	Vitamin B_1: 0·3 mg.; vitamin B_2: 0·3 mg.; nicotinic acid: 3 mg.; vitamin C: 235 mg.; dried yeast: up to 3 g.	(92, 246, 307)

(+) = supplementation is customary or suggested; no levels recommended.
(1) but including drinking water—though this, in the broader view, is also a "staple food"!

2. Other Cereals

Corn

The enrichment of corn is being undertaken in various states of the U.S.A.; corn, next only to wheat, is regarded there as the staple food. Corn enrichment is also being considered in Egypt.[281]

The supplements prescribed in the U.S.A. are (per kilo of flour or of grits): 4·4-6·6 mg. of vitamin B_1; 2·6-4·0 mg. of vitamin B_2; 35-53 mg. of nicotinic acid, 29-35 mg. of iron. For optional supplements, 550-2,200 I.U. of vitamin D, 1,100-1,650 mg. of calcium, and dried yeast up to a content of 1·5% are recommended.[140]

The enrichment of corn-grits presented certain difficulties at first. The following solution was finally found: a "pre-mix" is produced by spraying some corn-grits with water-soluble vitamins and minerals; these are dried, then coated with a harmless mixture of corn protein (zein), abietic acid, palmitic acid, isopropanol and water. A protective film is formed which is insoluble in cold water, resistant to moisture, free from smell and taste, and which is not attacked by enzymes. However, the film disintegrates in boiling water. This "pre-mix" is mixed with the corn grits in bulk in the proportion of 1 : 799.[239, 302]

Rice

The enrichment of rice, which is the staple food in many lands, was first tried in the Philippines in 1948, and met with great success. Since that time, rice enrichment has been undertaken in Thailand and in Japan, and in a number of states in the U.S.A. (Louisiana, South Carolina, California).[24, 281] Rice is also enriched on a small scale in certain Latin American countries (Cuba, Colombia, and Venezuela). In the Dominican Republic rice enrichment has recently been made compulsory and, as soon as technical facilities are available, enrichment will be undertaken on a large scale. In this connection it may be mentioned that vitamin B_2 and calcium can be included in the rice enrichment formula. The most common levels for rice premix are:

FORMULA WITH VITAMIN B_2

	mg./lb.
Vitamin B_1	400
Vitamin B_2	240
Nicotinic acid	3,200
Iron	2,600

The vitamin B_2 is omitted from some preparations. In Formosa, the enrichment of the rice given to the armed forces is accomplished by the addition of vitamin tablets to the finished cooked rice in the form of a suspension in water. (This is a temporary measure only.)

As an illustration of practical rice enrichment, brief reference may be made to the method established in the Philippines: a solution of vitamin B_1 and nicotinic acid is sprayed on to rice, tumbling in a rotating mixing-drum. A first coating—consisting of abietic acid, palmitic acid, and zein (corn protein) dissolved in isopropanol—is then applied whilst the grains are still wet. Following this the rice grains are dusted with a mixture containing talc and iron pyrophosphate. Finally, a second protective coating of the same composition as the first one is sprayed on the moving rice. The dry protective film which results affects neither the smell, taste nor colour of the rice; this, apart from any question of nutrition, was a

matter of the first importance to a people extremely conservative in their eating habits. (The film is soluble in hot water.)

The "pre-mix" is mixed with the bulk rice in the proportion of 1:199. The final product contains per kilo: 4·4 mg. of vitamin B_1, 33 mg. of nicotinic acid and 28·5 mg. of iron.[24, 141, 303]

3. Margarine

The enrichment of margarine with the vitamins A and D is now compulsory in Brazil, Colombia, Costa Rica, Denmark, England, Norway, and Sweden; vitaminisation of "vanaspati," a purified hydrogenated vegetable oil similar to margarine, is also compulsory in India.[304] The addition of the vitamins to margarine is also being undertaken on a large scale, voluntarily and without legal regulations, in Australia, Austria, Belgium, Canada, Chile, Finland, Germany, Greece, Holland, Italy, Mexico, Newfoundland, Peru, Portugal, South Africa, Switzerland, Turkey, the U.S.A., and Venezuela;[135, 136, 141] it is also customary in certain states of Latin America and in Russia. Some 80% of the world production of margarine is now being enriched with vitamins.[281]

It is not desirable that the entire requirement of vitamin A should be covered by the addition of the vitamin to margarine; but margarine should at least have the same value as summer butter. The usual average levels for the two vitamins lie, therefore, between 20,000-30,000 I.U. of vitamin A and 1,000-2,000 I.U. of vitamin D per kilo of margarine.[136] (See Table 6.)

4. Milk

At present, only vitamin D is used in practice to enrich (fresh) milk, primarily as a prophylactic measure against rickets in infants; and, although a supplement of vitamin A has been recommended (at 4,000 I.U. per litre), the wider application of enrichment to milk is not known, as yet.[18, 56, 91] In Switzerland, a supplement of fluorine to milk has been undertaken as a prophylactic measure against caries, but only to a limited extent.[38]

The enrichment of milk with vitamin D can be accomplished either by ultra-violet irradiation or by supplementation with suitable solutions of vitamin D; in most countries, preference is given to the use of vitamin D solutions because exact dosage is possible. Legal regulations controlling the addition of the vitamins to whole fresh milk do not exist; the vitamin D supplementation is done voluntarily in the individual countries, and it is mainly confined to milk intended for infants' diets.[135] (See Table 7.) It may be mentioned that the FAO has, lately, officially recommended the enrichment (with the vitamins A and D) of *all* bulk skim milk (skim milk powder) given as a substitute for fresh milk to the peoples of the so-called under-developed countries by welfare organisations such as UNICEF.[303] The supplementation with the vitamins should be made either before drying, or just before use.

5. Other Foods

The enrichment of foods other than staple foods is, with few exceptions, undertaken voluntarily; the exceptions are: the fluorine supplement added to drinking water, in some of the States in America; the iodine supplement in table salt in Switzerland, and the enrichment of various foods and beverages intended only for use in the armed forces in America. (See Table 8.) In Switzerland, by agreement with the food industry, the addition of the vitamins to stimulants—particularly to alcoholic beverages—is legally prohibited: the drinker is thus prevented from thinking that the more he drinks of such beverages (supposing them to have been "enriched") the less harmful—or even the more beneficial—their effects![306]

Of greater importance is the enrichment of "pasta" products recently undertaken, to a significant degree, in the U.S.A. and in Peru. The consumption of bread in these countries is constantly declining, and the demand for "pasta" is constantly increasing.

REFERENCES

References Nos. 1-277 appeared with Parts 1-5 of this article in our July-November issues.

278. R. C. Sherwood. Vitaminierung von Mehl in Kanada. *Müllerei*, 1953, **6**, 65.
279. H. Pourrat. The enrichment of flour. *La Hacienda* (Chile), September, 1953.
280. Definitions and standards of identity for bread and rolls. U.S. Food and Drug Administration, Federal Security Agency. Publish. i. the Federal Reg., May 15, 1952. *The American Baker*, June, 1952.
281. R. Szasz. La vitamination dans le monde. *Praxis (Schweiz)*, 1954, No. 6. 122.
282. K. Rauscher. Die Vitaminierung der Lebensmittel. *In:* Ernährung und Lebensmittelchemie, Tagungsbericht der chem. Ges. i. d. DDR. Dtsch. Verlag d. Wissenschaften, Berlin, 1955.
283 K. H. Wagner. Die Notwendigkeit der Mehlvitaminisierung in Deutschland. *Die Müllerei*, 1955.
284. W. Bernardi. Die Getreidekornkeimung und das Keimbrot. (Manuscript.)
285. "Vitaminisierte Mehle," das Anliegen der Ernährung-physiologie und die Belange der Müllerei. *Die Mühle*, 1953, **90** (5), 1.
286. M. Hengst, M. Rohrlich and M. Scheuer. Über den spezifischen Einfluss von Calciumverbindungen auf Teigführung und Backprozess. *Ernährung u. Verpfl.*, 1949, **1**, 50.
287. E. Remy and W. Schreiber. Vergleichende biologische und chemische Untersuchungen von deutschem Heeresbrot, Roggenvollkornbrot und Weissbrot zur Feststellung ihrer biologischen Wertigkeit bei Ratten. *Arch. Hygiene*, 1933, **110**, 164.
288. E. Eckstein. Vollkornbrot Vor- und Nachteile. *Med. Welt*, 1930, **4**, 431.
289. A. Henriquez and H. Pourrat. Chemical composition and baking properties of flours of different milling treatments. *An. Bromatologia* (Chile), 1953, **5**, 69.
290. S. Borgström. Nahrungsphysiologischer Wert der Weizenkleie. *Acta physiol. Scand.*, 1941, **2**, Suppl. VII.
291. A. M. Leroy. Physiologische und wirtschaftliche Nachteile der Zugabe von Kleie zu Getreidemehlen. *C. r. Acad. Agric. France*, 1943, **29**, 199.
292. G. Willner. Ist starkere Getreideausmahlung ein Gewinn fur die Ernährung? *Mölkerei. Ztg.*, 1947, **1**, 61.
293. H. Chick. Nutritive value of white flour with vitamin B_1 added and of whole meal flour. *Lancet*, 1940, **239**, 511.
294. R. B. French and H. A. Matill. The biological value of the proteins of white, wheaten and rye breads. *Cereal Chem.*, 1935, **12**, 365.
295. N. B. Guerrant and O. B. Fardig. The thiamine and riboflavin content of whole wheat, non-enriched and enriched flours and breads made therefrom. *J. Nutrit.*, 1947, **34**, 523.

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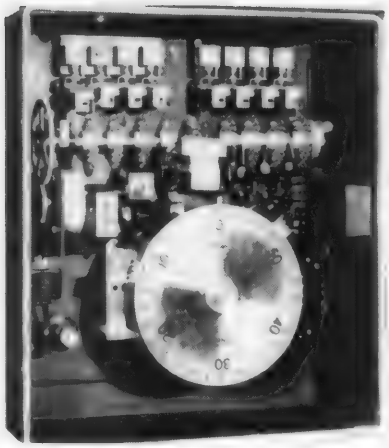
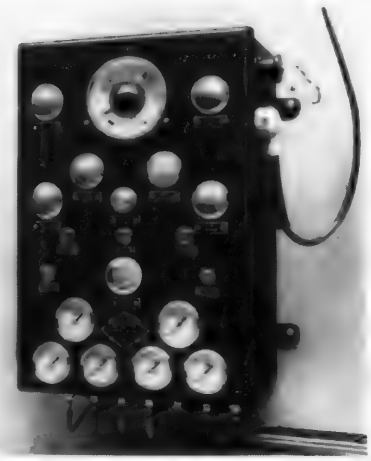




(Left): **The Taylor Flex-O-Timer which has been installed in the new Heinz factory at Kitt Green, Lancs., for controlling the entire sequence of operations in the canning retorts.** *(Right):* **The Cambridge Numalec controller which will monitor a complete manufacturing process at the press of a button. It is used with the Cambridge Recording Controller shown in the centre.**

CONTROL AND MEASUREMENT

New Instruments Lead the Way to Automation

Progress towards automation and the increasing use of new techniques in manufacturing have been made possible only by the introduction of new methods of instrumentation. Here is a guide to the latest instruments and control systems for process control, package monitoring, quality checking and safety.

I. PROCESS CONTROL

Automatic process timers

A TAYLOR *Flex-O-Timer* has been installed in a factory under construction for H. J. Heinz and Co., Ltd., at Kitt Green, near Wigan, Lancs. This instrument is a time programme controller for the fully automatic control systems of the canning retorts; the system is fully automatic and the instrument initiates various steps in the process at definite intervals, *e.g.* venting, sterilisation, and cooling, and it is interlocked with level indicators in the retort which signify when the retort is full of water or empty. The timer is said to be able to control up to eight processes at once, which can be either electric or pneumatic; thus solenoid valves and electrical relays can be eliminated from the control system. The programme can be changed by altering the trip pins round the timer dial. The *Flex-O-Timer* operates with a Taylor *Fulscope* Controller which controls the sterilisation period; the latter instrument is also used for pressure cooling by being synchronised to cut in at the end of the cooking period without a sudden change in retort pressure. Both instruments are mounted on centralised control panels which leave floor space clear for retort loading. Operations are controlled entirely from the panels; interlocks on the retort doors prevent the control system being started until the doors are closed, and also lock the doors in the closed position during operations.

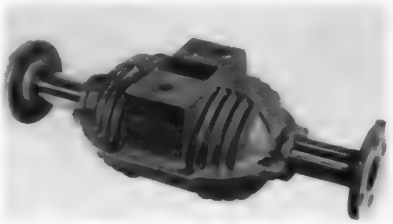
The *Numalec* automatic pneumatic/electric controller made by the Cambridge Instrument Company is a new instrument which is said to have a wide range of applications in both large- and small-scale industry. It is intended for the control of temperature, pressure, vacuum, level, etc., each for adjustable set periods and in the sequence required, and is used in conjunction with a Cambridge Recording Controller. An example of its use in its simplest form is the raising of the temperature of an electric oven to a set value, maintaining the temperature for the required period, switching off and indicating the completion of the cycle. In controlling a complete manufacturing process, it is said to be able to maintain one or more temperatures at the desired values for predetermined periods, to govern levels, pressures, and draining, to give warning of any supply failure, and to indicate the end of the process. There is no theoretical limit to the number of separate functions which can be set into operation, one after the other, nor the time for which any operation can be under control. One process timing clock is needed for each function, but the makers say that this can be of any type, from minutes to days, and can be mounted in any position. At the end of one function, another can be started immediately or after a preset delay, and the operation is repeated until all functions have been completed. The unit parts are standardised with the intention of making possible the construction of a comprehensive controller to an individual specification, and applications being considered include bacon curing.

Flowmeters

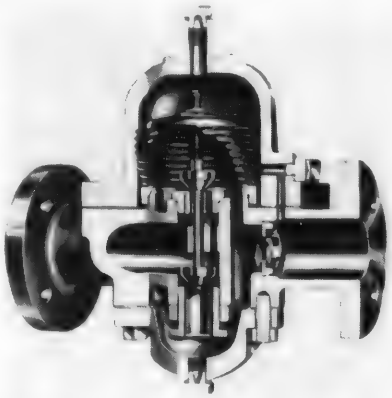
Foxboro-Yoxall, Ltd., manufacture a wide range of control systems, and among those of particular application to the food industry is the *Magnetic Flow Meter* which is said to offer important advantages over flow meters of the differential pressure and variable area type. It has been designed to measure the volume flow rate of all fluids with an electrical conductivity, particularly fruit pulps, fruit juices, beer, and other food products. In this instrument there is said to be no restriction of the flow line, no loss of head, and no pressure taps to become blocked, so that fluids can be measured with sustained accuracy; it is said that the performance of the meter is unaffected by variations in density, turbulence, viscosity, or suspended matter. The meter consists of the transmitter and a *Dynalog Flow Receiver* which may be an indicator, a recorder, or a multi-record dynalog. The transmitter itself consists of a stainless steel tube through which the liquid passes, an electrical insulating liner on the inside of the tube, an electromagnet which induces a magnetic field across the tube, and two metallic electrodes flush with the inside surface of the tube. Transmitters can be supplied in sizes from 2 to 8 in. (other sizes by request) suitable for flow rates from 0-2,500 g.p.m. to 0-40,000 g.p.m. Reverse flows may be measured and a totaliser, to give flow totals, may be incorporated.

A simple flow controller which is operated solely by the pressure energy of the liquid is the *Flostat* manufactured by G. A. Platon, Ltd. It is said to be the first self-acting flow controller to be developed in the U.K., being the invention of K. L. Butcher of Leeds University. The instrument embodies an orifice-type flowmeter with metal bellows sensing element rigidly connected to the stem of an accurately balanced double-beat poppet valve. It forms a factory-calibrated unit which when placed in a pipeline, is said to pass liquid at one flowrate only irrespective of changes in upstream or downstream pressure. It is said to be much cheaper than electric or pneumatic controllers, an advantage gained of course by accepting a fixed setting instead of modulated control. The instrument has so far been used for blending of liquids (*e.g.* for soft drinks production), filtration control, distribution of refrigerated liquids, controlled addition of additives, and for the distribution of service liquids and fuels. Various models are available.

The Foxboro-Yoxall M 41A Indicating Controller is air operated and controls pressure, temperature, relative humidity or liquid level, besides being a receiver for pneumatic signals.



The Foxboro-Yoxall Magnetic Flowmeter offers no resistance to fluid flow and is unaffected by variations in density, turbulence, viscosity or suspended materials.

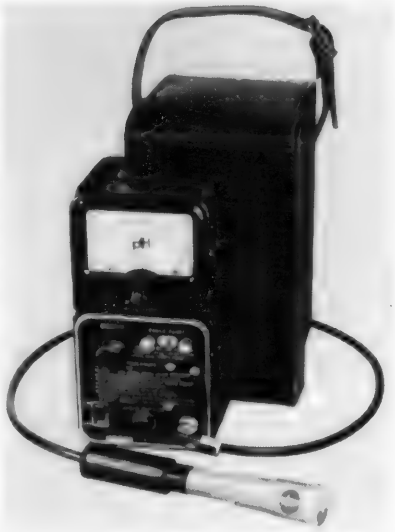


The Platon Flostat is a self-acting flow controller operated by the pressure of the liquid flowing through it, and passes liquid at one flow rate only, irrespective of pressure changes.

***p*H measurement**

A small meter manufactured by Analytical Measurements, Ltd., is self-contained with batteries, and is supplied in an ever-ready case with tubes of KCl buffer solutions. A shoulder strap allows the instrument to be slung over the shoulder or hung round the neck leaving both hands free. The meter is scaled from 2 to 12 *p*H, and readings from 0 to 14 can be obtained by an adjustment. Hearing-aid type batteries are used, for which a life of up to 1,300 hr. operation is claimed. The electrometer tube, switch, and input connector are sealed in a single unit, ensuring, it is claimed, freedom from high humidity difficulties. Control is by a single knob, and the makers say the instrument can be operated by untrained personnel. It can be used very conveniently for *p*H testing in the factory.

The *Portable* p*H Meter* made by W. G. Pye and Co., Ltd., is also a self-contained battery operated unit. Another *p*H meter made by the same firm is the *Dynacap* p*H Meter*, the basic scaling of which gives two main ranges of 0-10 and 4-14 *p*H units on a 5 in. scale; an amplifier enables a seven-fold expansion to be obtained giving an effective scale length of 35 in. A lower scale reads from 0-2 *p*H in 0·02 *p*H divisions. A range switch is provided to select not only the main ranges but also sub-ranges of 2 *p*H each, 2-4, 4-6, etc. The instrument has automatic compensation for temperature enabling the operator to standardise at one temperature and to take readings at another without recourse to tables or calculations. Manual temperature compensation is also included. An instrument similar in design is the *Dynacap Industrial* p*H Meter* which is intended for factory operation under adverse conditions. The output may be used to operate recorders, controllers, and alarm relays.



(Left): The Pye Dynacap *p*H Meter has automatic temperature compensation. *(Right)*: The Analytical Measurements Pocket *p*H Meter is battery operated and self-contained, and can be used for spot checks in the factory. *(Below)*: The Ether Thermal-Trol Temperature Controller Type 750.

Temperature control

The *Thermal-Trol Type 750* made by Ether, Ltd., is designed to control temperatures from −200°C. to +1,000°C. with a sensitivity of about one-eighth of a degree. It is essentially a platinum resistance thermometer with an A.C. bridge circuit; a relay opens or closes an electrical circuit depending on the input voltage to the amplifier. There is no galvanometer, and the instrument is said to be unaffected by vibration or ambient temperature and to have a high accuracy.

A range of automatic temperature controls is manufactured by the Rheostatic Co., Ltd., for many applications; their *Satchwell Duotronic* system has been developed to provide a simple, sensitive, and stable control at a lower price than hitherto. The system is said to be simple to install, operate, and maintain.

Level indicators

The *Pneumerstat* made by Williams and James (Engineers), Ltd., is said to combine the duties of a reducing valve, flow control valve, and level indicator. Its uses are for supplying a measured quantity of air for depth measurement when used with a manometer or low pressure scale indicator, and for gas purging and gas sampling.

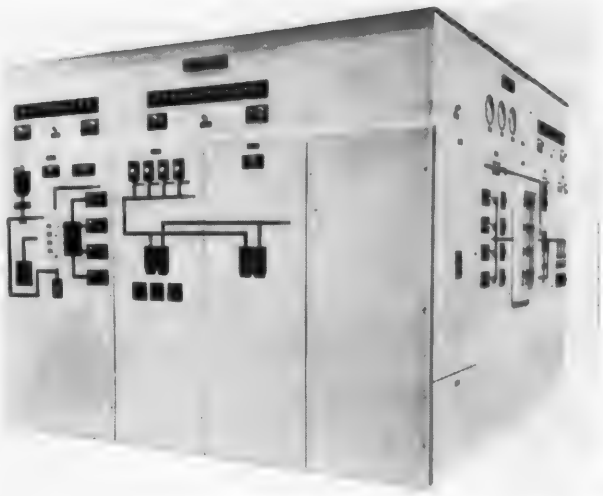
The *Pneutronic* on/off level controller manufactured by Fielden Electronics, Ltd., provides an output air pressure suitable for operating a standard pneumatic diaphragm control valve. It functions by measuring the change in electrical capacitance of an electrode mounted in a container in which there are no moving parts, and has been designed to control the level of any liquid or granular solid where the valve or other regulating device is, or can be, air operated. The electrode must be chosen to suit the particular application.

Density measurement by radioactivity

Isotope Developments, Ltd., produce a number of instruments of interest in process control, among which is the *Density Gauge Type 887*, which is claimed to indicate and record the density of any liquid or slurry, such as ærated liquids and pastes, in pipes or tanks of external diameter from 6 to 18 in. The equipment is mounted externally, and consists of a source unit, detector unit, main electronic unit, indicator meter, and/or recorder alarm unit. The source unit contains a lead-shielded capsule of radioactive cæsium 137. The shield is fitted with a shutter, which when opened allows radiation to pass over a small solid angle. The amount of radiation received by the detector unit is amplified and recorded; the scale can be calibrated and graduated in percentage solids or other units according to the user's needs. Various standard commercial recorder units are available for use with the equipment and can be supplied with circular or strip charts in a range of sizes and chart speeds. Another instrument manufactured by this firm is the *GammaSwitch Type 656*, which may be used, among other applications, for liquid level control and for hopper door control; used in conjunction with a radioactive source, it is designed to operate a relay control when the strength of radiation increases or decreases, and is said to trip at intensities far below the levels at which radiation hazards occur.

A multi-purpose controller

An instrument made by Foxboro-Yoxall is the *M/41A Controller*, which is an indicating air-operated controller said to provide on/off or proportional action for pressure, temperature, relative humidity, or open tank level applications. It is also made as a pneumatic receiver for 3-15 p.s.i. signals. It is particularly applicable to such operations as the temperature control of canning retorts; a specially developed control unit is said to provide on/off action to an accuracy of 1% scale range. A variety of mountings are available.



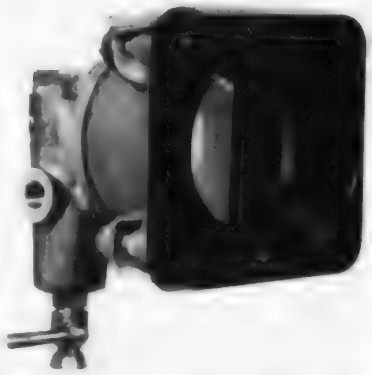
A Baker Perkins control panel designed to control bulk handling in a biscuit factory. Neon lights depicting the various valves, connections and motors give a complete picture on the mimic diagram of the plant in operation.

Control panels

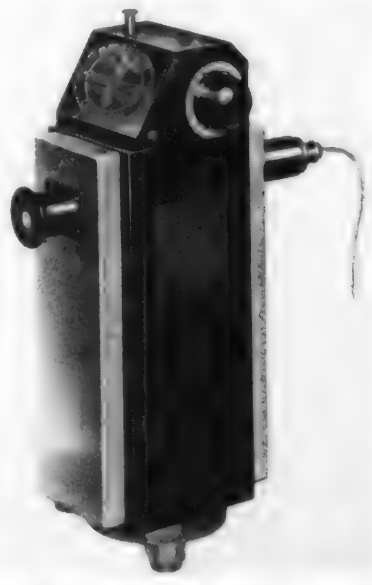
The control panel has become the brain for the automatic handling of bulk ingredients, and it is provided to govern the intake, blending, and batch weighing of a variety of materials. Baker Perkins, Ltd., have developed a system for the control of all internal distribution of bulk dry ingredients, which is claimed to preserve simplicity and to give the foolproof operation necessary to avoid a situation which could bring a production plant to a standstill. The Baker Perkins panel illustrated, which was manufactured by Morecambe Electrical Equipment Co., Ltd., was designed to control bulk handling in a biscuit factory. It consists of three electrically separate sections housed in one casing with independent isolation, the sections being intake, blending, and weighing. Each section has a group of neon lights on top, each one indicating, if it lights up, the overloading of a particular motor. The overload rating of the motors is set much earlier than is normal with automatic cut-off and gives early warning of the condition.

Water purification

In all water purification plants, some method is necessary for quickly assessing the clarity of water, and rapid and accurate readings are said to be obtainable with the *Turbidity Meter*, an optical instrument made by the Paterson Engineering Co., Ltd. It is permanently ready for use as it requires no adjustment or preparation of standard solutions. The instrument consists of a vertical ebonite body of 1 litre capacity, on whose back and front faces are mounted two mirrors facing each other at a slight angle and protected by aluminium back plates. Each mirror has an aperture, one permitting the passage of a ray of light from a lamp of standard strength and the other allowing the opposite mirror to be viewed. An arrow on the indicating knob gives a direct reading in units of turbidity on a circular scale. A vertical regulating rod enables the operator to use the slider as a stirrer, independently of the control knob, in order to prevent inaccuracy due to the settlement of the suspended content. The apparatus is portable, constructed of rustless materials, and requires no special skill in operation. It can be supplied for either battery or mains use.



The Williams and James Pneumerstat combines the duties of a reducing valve, flow control valve, and bubbler chamber.



The Paterson Turbidity Meter is an optical instrument for determining water clarity in water purification plants.

II. PRODUCT CHECKING AND PACKAGE MONITORING

Automatic weighing

Instruments for checking the weight, number, quality, and other properties of the finished product are of great importance to the manufacturer. Automatic instruments are necessary when the output is too great for individual inspection; one which comes into this category is the *High-Speed Electronic Check-Weigher*, made by the Solartron Electronic Group, Ltd., which is made in various sizes to check-weigh items from a few grams to 40 oz. gross weight at speeds up to 250 per min. As each object is weighed, its weight is indicated as correct, underweight, or overweight by means of green, red, and amber lights respectively, each with an associated counter. In addition, the under and overweights can be channelled to either side as required. The weight of each item, or the weight trend, may be recorded on a pen recorder, supplied as an optional extra, and suitable corrections to the filling machine may be made from this information. Dependent on the kind of package, it is said that accuracies of ±0·1% can

The Marconi Fluoroscopic and Radiographic Cabinet Type TF 1601 which can be used for the detection of foreign bodies in packaged products.

(*Right*): The Solartron High Speed Electronic Check Weigher in use by Scribbans-Kemp, Ltd., for the fast weighing of biscuit packages before closure.

be obtained. The equipment consists of three major units—the weighing head, the control cabinet, and the display unit. The weighing head is intended for direct installation in a flow production line with or without specialised mechanical handling facilities. The control cabinet is dust proof, and can be locked to prevent unqualified persons from altering the control settings. The display unit can be mounted where required, and contains the indicating lights and counters and the weight setting controls. This can also be locked to prevent unqualified interference.

Detection of foreign bodies

The *Fluoroscopic and Radiographic Cabinet Type TF 1601*, recently introduced by Marconi Instruments, Ltd., is said to be particularly useful for the detection of foreign bodies in packaged products. Small items can be directly viewed by X-ray fluoroscopy. An inspection drawer 5 in. deep, mounted above the tubehead, will accommodate objects up to 12 in. by 10 in. The tubehead can be removed so that oversize objects can be radiographed. The unit is self-contained and, when fitted with castors, can be moved about. The cabinet is leadlined to protect the viewer, and the controls are said to be simple. Tubeheads and h.t. generators of different outputs are available for different tasks.

Fluorescence is being increasingly used to detect impurities, such as mineral oil, which fluoresce, and to detect bacteria in contaminated eggs and on meat, which fluoresce strongly. The *Hanovia Ultra-Violet Fluorescence Lamp Model 17*, made by Engelhard Industries, Ltd., is a 2 Kw. mercury vapour lamp mounted between a reflector and heat resistant filter glasses, designed to be suspended over an inspection bench.

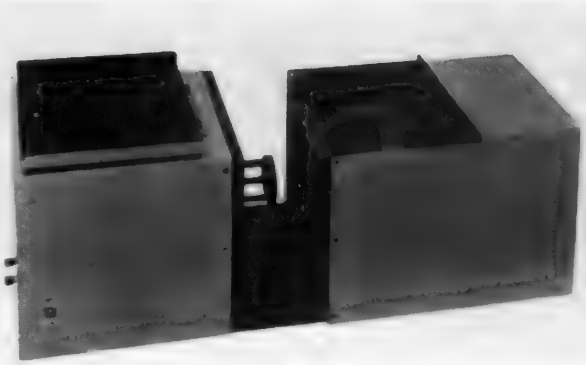
Package monitoring by radioactivity

Isotope Developments, Ltd., have applied the use of a radioactive isotope to the field of package monitoring in their *Package Monitor Type 210*, which consists of three main units—a radioactive source and detector unit, a photoelectric cell and lamp unit, and an amplifier. The instrument is designed to examine, on a conveyor line at high speed, the packing of solids, liquids or pastes, either before or after the containers have been sealed. It ascertains that the containers have the correct number of items, and are neither under nor overfilled. The monitor is not designed to check materials which are packed strictly on a check weight basis and where the volume of the contents varies widely with density, but it is said that its continuous and automatic operation at high speed makes it suitable for direct attachment to fast moving conveyor systems where check weighing is too slow. The source is mounted on one side of the conveyor line and the detector on the other, so that the packages pass between. The instrument is designed to operate only when there is a package between the source and the detector. This is arranged by using a photo-electric cell and lamp as switch; the light to the cell is interrupted when the package is in the inspection position.

Isotope Developments' Density Gauge Type 887, showing the source unit (*left*) and the detector unit. It indicates and records the density of any fluid or slurry.

Clarity of plastic wrappings

As plastic wrappings are becoming increasingly popular in this country, there has developed

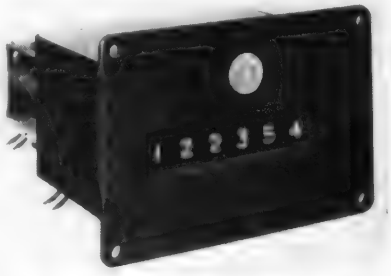


The EEL Spherical Haze Meter is used to assess the clarity of transparent wrapping materials.

a more critical appreciation of their clarity. Purchasers became aware that some wrapping materials were clearer than others and this had an effect on sales. The need therefore arose for an instrument that would check wrapping material clarity. The *Spherical Haze Meter* has been developed by Evans Electroselenium, Ltd., in accordance with a specification published by the American Society for Testing Materials that gives a standard method of test for haze and luminous transmission of plastic materials. The instrument operates in conjunction with an EEL *Unigalvo Type 20*, which also supplies power to the haze meter light source. The core of the instrument is a sphere with a highly reflecting internal surface and with an entrance and exit port. A parallel beam of light shines into the sphere through two lenses which are focussed so that an image of the first lens is projected on to the second lens. The specimen is placed in a holder at the entrance port. A black cover plate may be positioned in the light beam on the opposite side of the sphere and will absorb all light falling on to it. This trap is swung out of the beam by slightly revolving the sphere so that light is directed on to the highly reflecting surface inside. The resultant scattering of light is then measured by a photo-electric cell mounted at right angles to the beam and shielded from the entrance and exit ports of the sphere by baffles. Full-scale deflection and zero settings are obtained in this way without the sample in position.

Counting instruments

The *High-Speed Batch Counter* made by Elcontrol, Ltd., is of the fully electronic type and will accept normal external pulses, including those originating from a photo-electric cell. The unit can also be arranged to generate its own pulses and is therefore designed to operate also as a timer and time measurer if desired; various combinations of timing functions can be obtained as required. The instrument is said to be particularly suitable for the inspection and control of numbers and position both in processing and packing. The same firm also manufacture a range of photo-switches and relays, all actuated by a change in the intensity of light falling on a photo-electric cell, which are said to have many applications, such as counting, inspection for position, sorting by size or mark, conveyor monitoring for under or overloading, off or on loading control, elevator level control, and door opening control. Specialised types of photo-electric control gear are also available for many other duties.



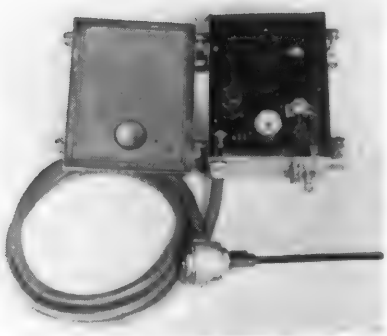
The Elcontrol High Speed Batch Counter which can be used in a large number of ways and can also function as a timer and time-measurer.

The Shaw Recording Hygrometer provides a continuous record of relative humidity and can be used at temperatures up to 150°C.

III. HUMIDITY CONTROL

An instrument recently announced by Shaw Moisture Meters, Ltd., is said to give immediate and continuous recording of the humidity of even the most "dry" gases. This is their *Recording Hygrometer*, which gives full-scale deflection for readings of 5% R.H. or less and also to give warning of any increase in humidity in less than one second. No knobs or controls are fitted, as the makers claim that the long-term stability of the instrument makes these unnecessary. The sensing of moisture is done by a new type of small element consisting of a hygroscopic dielectric a few microns thick covered with 24 ct. gold. As the sensing device is in the form of a variable capacitance, contamination, it is claimed, does not present the difficulties experienced with other hygrometers which use conductive type elements.

Elliott Brothers (London), Ltd., have recommenced manufacture of their direct-reading *Humidity Transmitter* with its associated indicator, recorder, and/or controller. This equipment works on the wet and dry bulb principle and is equipped with its own fan, making it suitable for use where there is no air flow. The bulb temperatures are measured by means of platinum resistance thermometer elements which the makers claim makes the instrument suitable for high humidities. A number of transmitters can be used with a



The Fielden Electronics Electronic Pneumatic Level Controller controls the level of liquids or solids which may be corrosive or at high temperature and pressure.

single recorder by means of a selector switch.

Air conditioning

The condition of the air surrounding food products during manufacture affects product quality and appearance. Many biscuit and sugar confectionery manufacturers are using air-conditioning systems.

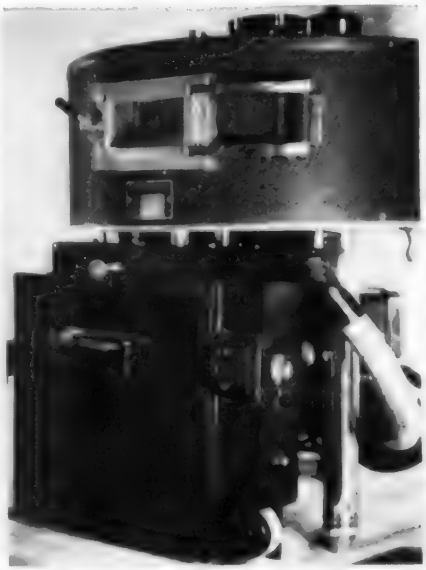
The temperature control system designed and manufactured by Honeywell Controls, Ltd., operates on signals from thermostats sited in both extract and discharge ducts, which are connected to an electronic control panel. On a rise in temperature a motorised step controller switches on a refrigeration plant in stages. On a fall in temperature below the set point, a modulating motor operates a valve supplying steam to heat exchangers providing the right amount of heat.

For humidity control, a fan system sucks air into dryers, where beds of activated alumina extract moisture from air passing over them, down to a very low dew-point. The air is then injected back into the circulation system through a built-in cooler, which compensates for rises in temperature during drying. The valve system supplying air to the dryer, manufactured by Birlec, Ltd., slowly rotates, ensuring that part only of the activated alumina is in use at any moment, while the unused section of the beds is being re-activated. A relative humidity element operates a contactor, which starts or stops the drying system. This provides accurate on-off control of relative humidity in the main circulation system.

IV. LABORATORY INSTRUMENTS

Moisture testers

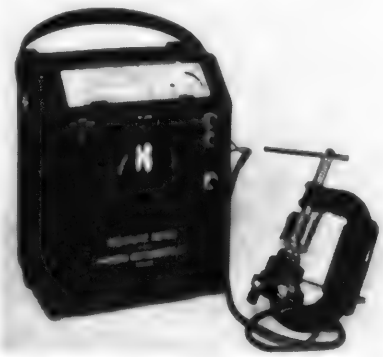
The *Moisture Meter TF 933A* made by Marconi Instruments, Ltd., permits the rapid and accurate measurement of a wide range of materials, particularly those of organic origin such as cocoa, coffee beans, flour and meal, gravy powder, jelly crystals, macaroni, milk powder, rice, and tea. It is claimed that the instrument is very easy to use and



The Voss Rapid Moisture Tester M.T.2 is a precision laboratory instrument comprising an oven and a balance; moisture content is read on a scale.

checks may be carried out by operatives with no knowledge of electronics. The standard model is powered by long-life dry batteries, but these may be replaced by an A.C. power pack which is available as an optional accessory. Measurement is made between the two concentric annular metal electrodes which form the base of the test cell. The mechanical arrangement of the cell and clamp permit great pressure to be developed on the specimen under test with the minimum of effort. The makers say they have paid particular attention to those features of design which promote speed of loading and unloading, and ease of cleaning the cell. The range of measurement is from somewhat below the air-dry value to near saturation point with a basic accuracy within 0·5 moisture content.

The *Rapid Moisture Tester M.T.2* made by Voss Instruments, Ltd., is a combination of a drying oven, a circulating fan, and a precision balance. The operator places the samples in the oven and after the drying is completed depresses the balance lever and reads the results in percentages on the illuminated scale. It is said that no correction factors, charts, or tables are required with this moisture meter, and that all powdered, granular, and fibrous materials can be tested, if necessary simultaneously. A small fan forces air through a preheating chamber into the drying oven which is arranged immediately above. This current of air leaves through three ducts carrying the moisture with it. Samples up to ten in number can be tested at one time. Ten g. of material are weighed into each of the weighing dishes, whose weights are identical, and placed on a revolving tray in the oven. This tray is turned by means of a handwheel so that each dish is weighed separately by pushing a balance lever downwards. The drying chamber is insulated to prevent heat losses. The temperature is controlled by means of a bimetal thermostat and relay. An oil-damped balance is arranged



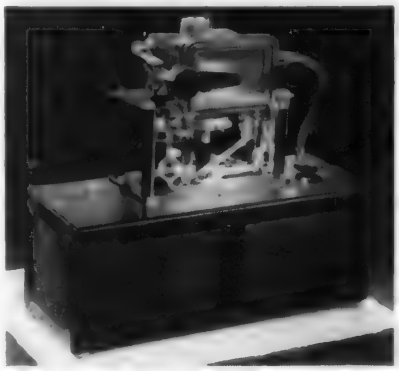
The Marconi Moisture Meter Type 933A can be used by unskilled operatives for spot checks of the moisture content of a wide range of materials.

underneath the drying chamber with three prongs extending into it. The prongs are lifted by depressing the balance lever and these lift and weigh the sample in the drying chamber. This balance is specially calibrated to indicate the loss in weight (*i.e.* the moisture content) in percentages. A system of lenses and mirrors projects the reading on to an illuminated scale, which is graduated in 0·2% divisions and can be read to 0·05%.

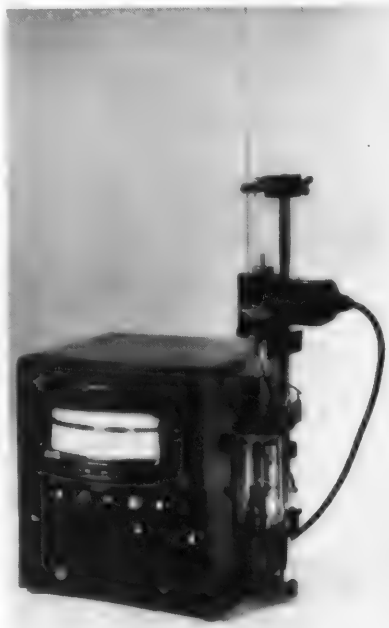
Sampling of bacteria

A *Slit Sampler for Airborne Bacteria* made by C. F. Casella and Co., Ltd., is intended for use by those concerned with the maintenance of clean air conditions. It is designed to sample the population of airborne bacteria in a wide range of places with concentrations varying from 1 to 100,000 per cu. ft. Two basic models are available; the makers say that the smaller one is the more popular. In the small model, air is sucked through a narrow slit on to an agar culture plate whose surface is adjusted to be 2 mm. below the plate. During suction the plate is rotated at a uniform speed in order to spread the bacteria round the plate, and to allow subsequent calculation of the precise time at which any particular bacteria were collected. The culture plate is then incubated at a temperature of 37°C. or lower, for a suitable time, depending on the tests being made. After incubation, each of the original bacteria-carrying particles forms a visible colony. These can be counted either directly or through a ruled screen, or better, by placing the plate in a projection apparatus so that a magnified image is projected on to bromide paper through a ruled screen. This method enables a permanent record to be kept of each plate. The turntable on which the culture plate rests is enclosed in a metal box with an air-tight glass door. The slit, 0·3 mm. wide, is in the top of this box, with its length radial to the surface of the plate, and is so positioned that a circular space in the centre of the plate does not pass under the slit. The distance between slit and plate is adjustable. A synchronous motor rotates the plate, and three speeds of rotation are obtainable—namely, 1 revolution in ½ min., 2 min., and 5 min. An automatic switch ensures that the culture plate will rotate once only, but continuous rotation is obtainable if desired. A manometer indicates the correct suction pressure which corresponds to an air flow rate through the slit of 1 cu. ft. per min.

The Isotope Developments Package Monitor Type 210 is fitted into a production line to check correctness of filling of containers.



The Casella Slit Sampler for Airborne Bacteria enables bacterial populations to be sampled under standard conditons in a wide range of places.



The Doran Automatic Titrimeter removes the drudgery from routine analytical determinations.

Titration instruments

An automatic titrimeter manufactured by Doran Instrument Co., Ltd., enables automatic titrations for either rising or falling values of *p*H to be made. It is suitable for use with normal glass electrode/calomel element cells, with ranges of measurement 0-10 and 4-14, *p*H, and 0-1,000 mV., with manual temperature compensation for *p*H measurements in the range of 10-45°C. A titration assembly, consisting of the electrode system together with a variable speed stirrer motor and a solenoid-operated valve controlling the addition of reagent from a burette, is mounted on the side of the instrument case so that the instrument comprises all the necessary equipment for carrying out titrations. The solenoid-operated valve gives a fast or slow addition of reagent according to the setting of the controller. The slow rate may be varied by a screwdriver slot control between 5 and 0·02 ml./sec. It is claimed that the accuracy of measurement is ±0·1 *p*H or ±10 mV. according to the range in use, and that the reproducibility of titrations is of the order of 1 drop. The accuracy of *p*H measurements may be increased by buffering the electrode system at or near the end point.

A titrator which is not automatic but which is claimed to eliminate the human element, is that made by Evans Electroselenium, Ltd., who say that this instrument is particularly suitable for providing accurate readings where the colour change representing the end point is slight. It operates in conjunction with an EEL *Unigalvo Type 20*. A known volume of sample is

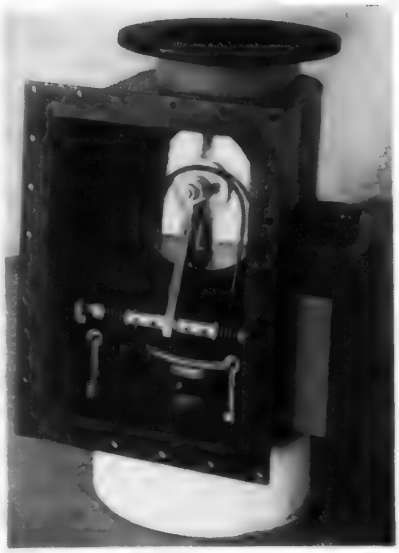
placed in a beaker with a buffer solution and to it is added a small amount of indicator. A magnetic stirrer is then switched on, and the mixed solutions become coloured. Measured quantities of reagent are then added from a burette with continued stirring, each addition causing a change in colour which in turn gives a different reading on a galvanometer scale. If the procedure is continued, a stage is reached when the addition of reagent results in a much greater change in galvanometer readings. The point at which the largest change in reading occurs indicates the end point. Some examples for which the makers say this instrument is particularly useful are the determinations of calcium, magnesium, and fluorides.

Instruments for chromatography

Baird and Tatlock (London), Ltd., manufacture a complete range of chromatographic equipment, useful to the analyst working with food colours and antioxidants. An entirely new apparatus is the *Centrifugal Chromatograph* for chromatographic separations on filter paper. It employs a driven spindle to which is attached a disc of filter paper. The speed of rotation can be varied between 300 and 2,000 r.p.m. Compounds to be separated are applied in the form of a spot near the centre of the paper, and the application of a continuous flow of solvent to the revolving paper disc is said to result in sharply defined radial separations. Centrifugal chromatograms can be completed in a matter of minutes, the average development time, so it is said, being 6 min. The separation chamber is entirely of glass and the operation is visible throughout.

V. FIRE DETECTION

The detection and control of fire and explosions is particularly important to the food manufacturer who handles finely divided inflammable materials such as grain, icing sugar, cocoa, and gravy powder. Even materials like chewing gum which will not burn readily in the bulk will explode when in a sufficiently divided



The Graviner Fire Detection Valve closes automatically in less than 80 milliseconds and prevents explosion propagation throughout a plant.

state. The Graviner Co., Ltd., claim that during the past three years their fire protection methods have prevented dust explosions in over a dozen factories, and that for an outlay of about £4,000 have saved explosion and fire damage which may have exceeded £100,000.

The system employed by this firm uses several techniques, sometimes used singly but more often in combination. In principle, the beginning of an explosion is detected by methods which enable control action to be taken so

The Minerva Fire Detection Apparatus gives rapid warning and can be used to operate automatic fire suppressors.

quickly that explosion pressures do not have time to build up dangerously. To prevent the propagation of explosions throughout a system, rapid isolation of the various sections of a plant from each other is necessary, and for this purpose the Graviner *High-Speed Isolation Valve* has been designed. It is claimed that an 8 in. valve of this type closes in less than 80 milliseconds. This type of valve is usually supplemented by a suppressor operated immediately after it to extinguish any flame which might pass through before the valve has fully closed, and it is said that this combination gives isolation in less than 10 milliseconds. Advance inerting involves the injection of a suppressant in advance of an explosion flame front to prevent its propagation throughout the plant.

The system is electrically operated and self-monitoring; it gives audible and visible alarm in the event of a wiring fault, and is arranged to shut down the plant automatically should an explosion occur.

A different, but complementary, method of approach, which involves fire detection rather than explosion prevention is adopted by the Minerva Detector Co., Ltd. The sensitive element of the *Minerva Detector* is an ionisation chamber which consists of a 2½ in. diameter cylindrical gauze cage containing a minute quantity of radioactive material which ionises the air in the chamber and makes it electrically conducting. If a fire starts, the products of combustion, on entering the cylinder, cause a change in the electrical characteristics of the gas inside the ionisation chamber, which brings into action a balanced electronic circuit, the output of which operates the alarm system.

The detectors are connected in groups to a central control unit and signal panel, whose function is to provide stabilised voltage supplies to the detectors and to act as a receiver and indicator for alarm signals; these can be transmitted to fire stations or watch officers or be used to operate automatic fire-fighting equipment.

Advances in Food Technology

IRRADIATED FOODS

U.S. Army Acceptance Research

The U.S. Army Quartermaster Food and Container Institute has embarked upon a two years' study of irradiated foods with respect to consumer acceptance by forces personnel. In view of the highly successful applications, to date, of irradiation, particularly the long storage life of irradiated foods without refrigeration, it is felt that this method of preservation will render the armed forces less dependent on limitations of refrigeration and heat processing equipment and cold storage space.

The objectives of the research programme are the improvement in consumer acceptability, decreasing refrigerator requirements, eliminating insect infestation, increasing the variety of perishable goods served in rations under service conditions, and preserving assembled meals for use in aircraft during military operations.—*Quick Frozen Foods*, 1958, **21** (3), 126.

MEAT PRODUCTS

Bacterial Content after Processing

A safe process of preserving non-acid foods is accepted as one in which the spores of *Clostridium botulinum* have only an infinitesimal chance of survival. In testing practice, this organism is replaced by one even more heat-resistant but non-toxic, Cameron's Putrifactive Anaerobe No. 3679 ("PA 3679"). Meats tested were poultry, rabbit, and pork. The destruction of bacteria depends on time and temperature. It was found that the processing values in the coolest part of the container should be about 30 min. at 115·5°C., with a mean value of approximately 33 min. at 115·5°C. Statistical analysis showed that the lowest probable value which might be obtained with any type of meat or container is equivalent to 20 min. heating at 115·5°C. This is twice the lethal dose accepted for *Clostridium botulinum*.—A. Crang, M. Sturdy, and J. Bowcott, *J. Sci. Food Agric.*, 1958, **9** (9), 559.

Sterilising Process

Processing requirements for domestic methods of canning and bottling pork, joints of chicken and rabbit, sausage meat and brawn were studied. Variations in the types of equipment were considered. No process was accepted in which there was any risk of the amount of heat received at the coolest part of the pack falling below the equivalent of 5·8 min. at 250°F., twice the amount of heat required to destroy spores of *Clostridium botulinum*. The lowest equivalent recommended is 8·3 min. A longer processing time than 100 min. at 10 lb. p.s.i. steam pressure in a pressure cooker is not advisable, on account of deterioration of the products. Errors introduced by variations of barometric pressure and inaccurate pressure control are discussed.—A. Crang, M. Sturdy and J. Bowcott, *J. Sci. Food Agric.*, 1958, **9** (9), 565.

MEAT EXTRACT

Analytical Comparison

An extract of fresh ox muscle was prepared in a laboratory under conditions designed to lessen any chemical change. A complete analysis was made of this extract and compared with that of a commercial meat extract.

The compositions of the two extracts were remarkably similar considering the methods of extraction and the subsequent treatment. The major difference was in the loss of the free amino acids in the muscle extract and the development of brown pigmented substances in the commercial meat extract. The brown pigmented substances were thought to be of the Maillard type.

A triphenyltetrazolium-reducing substance, believed to be a sugar derivative, was found in the muscle extract and not in the commercial meat extract.—A. E. Bender, T. Wood and J. A. Palgrave, *J. Sci. Food Agric.*, 1958, **9** (12), 812.

FROZEN FOODS

Microbiological Examination

The methods recommended for microbiological microscopic examination of frozen fruits, vegetables, and precooked foods, are given in detail. Sections on each of the above types of foodstuffs are divided into subsections on macroscopic examination, microbiological examination, direct microscopic count, and interpretation of results.

With proper handling of precooked frozen foods, the bacterial counts should be low, but careless handling or poor sanitary conditions can result in enormous bacterial populations before the foods are frozen. The need for good sanitation and good manufacturing practice is all the greater as precooked frozen foods are often heated only to serving temperatures, with no possibility of reaching sterilising temperatures.

Precooked frozen meals consist of several components, prepared separately. Each of the components should be examined to obtain adequate microbiological information.—The American Public Health Association, *Quick Frozen Foods*, 1958, **21** (3), 119.

MILK

Light Effects on Storage

Studies carried out on the effect of light on stored homogenised whole milk have shown that both fluorescent and sunlight have marked effects on the quality characteristics. The same applies to milk products.

Milk stored in well lighted store display cases showed losses in ascorbic acid, riboflavin and vitamin A when they were not packaged properly. Undesirable flavour changes took place when the milk was exposed to fluorescent lighting for three days or more. The tests showed that a foil laminated carton was the only completely effective preventative to all undesirable changes in quality under fluorescent light.

If milk is allowed to stand on the doorstep in the sun considerable changes in quality take place. The riboflavin, ascorbic acid, and vitamin A were greatly decreased and undesirable odours appeared. Brown glass or foil laminated cartons prevented the appearance of these defects.—J. J. Birdsall, L. J. Teply, and P. H. Derse, *Food Technol.*, 1958, **12** (12), 670.

MILK CONTAINER

Disposable Polyethylene Tube

For milk distribution in the U.S.A. disposable polyethylene tubes or bags, made by heat sealing and sterilised electronically at the dairy plant, have been introduced. These plastic containers are placed in the bottom outlet of a can, folded to prevent contamination, and placed in position at a milk vending machine between top and bottom clamp mechanisms, which, when milk is required, automatically open and close on inserting a coin. Measured quantities of milk are delivered to a paper cup placed below the bottom outlet of the polyethylene bag. When the can is empty, the polyethylene bag, or tube, is removed and discarded.—*Modern Plastics*, 1958, **36** (3), 176.

VEGETABLES

Preserving Methods

Savoy spinach, white mushroom "buttons," cauliflower heads, broccoli, and beans are processed similarly with minor differences in blanching times. They require freezing at 0°F. Asparagus and maize are frozen at about −25°F.

[H].

The question of off flavours after defrosting is discussed, and this effect is suggested as largely due to the coagulation of the vegetable proteins. Referring to bacteria and moulds, many can withstand frozen storage in cans kept at 15°F. instead of 0°F., but these are usually harmless. *Clostridium botulinum* can survive freezing, but the risk is diminished the lower the storage temperature is after quick freezing. Lactic acid bacteria are stated to survive for two years in frozen packs. At 10°F., peas and some beans lose much of their ascorbic acid, which is retained in storage at 0°F. Off flavours are often caused by imperfect blanching. Peas may lose colour if the storage temperature is too low after freezing.

In conclusion, the author reviews the preparation of salted vegetables and dried vegetables, the latter being mainly herbs, such as cultivated thyme, mint, sage, etc.—E. Hardy, *Canning and Packing*, 1958, **28** (336), 6.

OXIDATION

Rancidity in Crisp Oatflakes

The oat fat in ready-to-eat, fully gelatinised crisp cornflakes prepared for raw enzyme-active groats lost its natural stability during cooking with steam.

The use of enzyme-inactive groats altered the situation insomuch as the degree of stability retained in the oat fat was then dependent on the duration of the steam cooking, the subsequent method of drying and the final moisture content of the flakes.

The last is stated to be critical, and the optimum moisture content is determined by the temperature of drying.—H. F. Martin, *J. Sci. Food Agric.*, 1958, **9** (12), 817.

FOOD POWDERS

Handling, Conditioning and Preserving

The main purpose of the desiccation of perishable foodstuffs is to arrest the chemical and biochemical processes. But the dehydration does not prevent all the destruction processes and even creates, in some cases, new conditions conducive to destruction. With powders, the surface exposed to atmospheric influences is enlarged, and the harmful effect of moisture is further increased by a tendency to lump. Other dangers are discoloration, rancidity, deterioration of taste and flavour. The presence of oxygen may be particularly harmful.

It is therefore essential to take special precautions in handling, packaging and storing foodstuffs in powder form. In the processing plant, care should be taken to protect the powder against harmful influences of light and moisture, and the need for careful handling may determine the choice of plant. For instance, to avoid the formation of pockets, electro-magnetically or mechanically vibrated suspended solos may be used with advantage. For the packaging of food powders, simple cardboard or cardboard-metal boxes are usually inadequate. When vacuum tightness is not essential, much use is now being made of cardboard-cum-polyethylene-cum-aluminium boxes, foils based on *Rilsan* or with natural or synthetic waxes. Vacuum sealing calls for all-metal containers. The danger of rancidity can be countered by using hermetic containers with low oxygen content. A number of methods are now available to deal with many varieties of food powders.—R. Deveaux, *Industries Alimentaires et Agricoles*, 1958, **75**, 735.

FATS

Blending and Measuring of Shortening

The differing types of shortening are discussed and defined as well as the different types that are in use in the United States. The characteristics of the various ingredients of the raw fats and oils are also mentioned.

The common control methods of testing used to measure the characteristics of shortening are reviewed, together with their relationship to performance. Newer control and research techniques, together with dilatometric and rheological techniques, are analysed. Data are presented showing the dilatometric values of common fats.

Blending of fats on the basis of their dilatometric value is considered and some of the peculiarities of fats in such blends are shown. Data on the rheological values of common and special types of shortening are presented. Techniques used in measuring the functional characteristics of shortenings by means of test cakes, etc., are explained.—J. B. Woerfel and R. W. Bates, *Food Technol.*, 1958, **12** (12), 674.

EDIBLE GEL

Distilled Monoglyceride Source

Monoglycerides, prepared from pure glycerine and cotton-seed oil, hydrogenated vegetable oils, hydrogenated lard, soyabean oil or oleic acid, have the unusual property of forming solid gels when mixed with water at or above the melting point of the monoglycerides. Three methods of preparation are described, the simplest of which consists of pouring the melted monoglyceride into one or more volumes of water at the same temperature. The gel, which forms immediately, is worked to secure uniform incorporation of water. Excess water is readily decanted. The gel usually contains from 20% to 25% of water. Many applications are envisaged on account of their high nutritional value.—*Chem. Proc.*, 1958, **4** (9), 10.

Improving Nutritive Value

(*Concluded from page* 69)

296. B. D. Westerman and E. G. Bayfield. Enriched, Morris type and whole wheat flour as sources of the B-complex vitamins. *J. Nutrit.*, 1945, **29**, 27.

297. B. D. Westerman, D. R. Linn, F. Templeton and R. I. Wells. Improving the nutritive value of flour. III. The use of enriched and non-enriched flour in diets similar to those consumed by certain low-income groups in South Carolina. *J. Nutrit.*, 1949, **38**, 421.

298. B. D. Westerman and M. Stone. Improving the nutritive value of flour. IV. The significance of the use of enriched flour in the diet. *J. Nutrit.*, 1951, **44**, 313.

299. P. B. Mack, A. K. Milson and P. L. Carney. A Study of Two Levels of Bread Enrichment in Children's Diets. Monographs of the Society for Research in Child Develop- **1** (1), 42.
ment., Inc., Vol. XVIII, Serial No. 57, No. 2, 1953.

300. E. M. Widdowson and R. A. McCance. Studies on the Nutritive Value of Bread and on the Effect of Variations in the Extraction Rate of Flour on the Growth of Undernourished Children. Medical Research Council, Special Report Series, No. 287, London, 1954.

301. W. Halden. Gültigkeit des englischen Vitaminbrotversuches an deutschen Kindern bestritten. *Brot und Gebäck*, 1956, **10**, 87.

302. M. F. Furter and W. M. Lauter. Stärkende Produkte aus Getreide. U.S. 2475133 (July 5, 1949); ref. *Chem. Abstr.*, 1949, **43**, 8071e.

303. M. F. Furter. Die Entwicklung eines praktischen Verfahrens zur Vitaminierung von weissem Reis. *Int. Z. Vitaminforschung*, 1952, **23**, 324.

304. "Roche" Vanitin for the vitaminisation of Vanaspati. Hoffmann LaRoche and Company, Basle.

305. World Health Organisation, Technical Report Series, No. 97. Joint FAO/WHO, Expert Committee on Nutrition, Fourth Report, 1955, 27.

306. Vitaminierung von Genussmitteln in der Schweiz abgelehnt. *Alkoholindustrie*, 1956, **69**, 15.

307. C. Niemann. Nahrwert u. Vitaminenrucherung von Süsswaren. *Assoc. Inter. des Fabricants de Confiserie, Paris*. Gen. Meeting, Amsterdam, 1955.

Machinery and Equipment

HYDRAULIC OPERATION

An automatic *Megator* pressure system to provide a constant water supply for the hydraulic operation of salt valves, has been installed recently by the Middlewich Salt Co., Ltd.

The valves, which are an essential part of the plant, are operated on a time cycle by water supplied from a pressure vessel at a pressure of between 65 and 80 lb. p.s.i. The required pressure is maintained automatically in the vessel by two *Megator M* 16 cast iron sliding-shoe pumps—main and standby—each capable of suppyling 800 gal. of water per hr. at a maximum working pressure of 85 lb. p.s.i.

In the pressure lines between the pressure vessel and the three salt valves is the control panel, on which are mounted three solenoid-operated changeover valves operated by time switches. During the cycle of operation, each changeover valve in turn admits water under pressure to the appropriate salt valve.

The pressure system equipment, comprising pumps, pressure vessel, pressure switches, automatic starter and selector switch, was supplied by Megator Pumps and Compressors, Ltd.

A Megator automatic pressure system, used to provide a constant water supply for the hydraulic operation of valves at salt production plant of the Middlewich Salt Co., Ltd.

PACKAGED DRYING UNIT

A small self-contained drying unit suitable for processing a wide range of materials in the form of powders, filter cakes, granules, etc., has been produced by Dunford and Elliott Process Engineering, Ltd., as a packaged version of their *Rotary Louvre Continuous Dryer*. This new model can be used for carrying out tests as a preliminary to full scale processing or for the rapid and continuous handling of small quantities of materials. Besides drying it is capable of roasting and cooling.

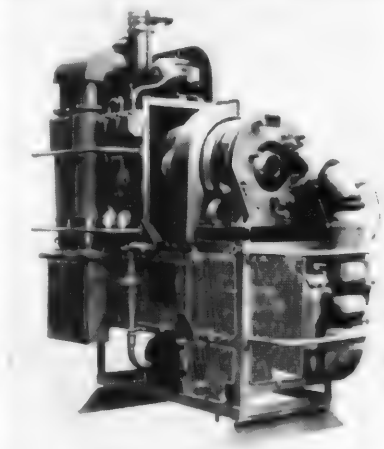
The package dryer has a holding capacity of approximately one cubic foot of material maximum, and the drying time may be varied between 5 and 60 min. to suit the moisture content and the type of material to be processed. It is estimated that under favourable conditions the unit is capable of evaporating 100 lb. of free water per hr., while based on the above holding capacity and drying times it will handle between 1 and 12 cu. ft. of material per hr.

The installation consists basically of a rotary louvre horizontal drum mounted on four adjustable supporting rollers and driven by a ½ b.h.p. motor through a single reduction gearbox, two fans, inlet and exhaust, powered by a 1 b.h.p. motor with a vee rope drive, an air heater of the direct type with combustion chamber fitted with a *Hypact* burner and hand control cock and a dust collector attached to the exhaust hood.

All the parts of the drum which come in contact with the material are made of stainless steel.

The package dryer is supplied ready for operation, it being merely necessary to connect one electrical and one gas point. Alternative heating arrangements by means of electricity, oil or an indirect air/steam heater can be provided as required.

The unit may be operated at any temperature of inlet air up to 450°C.



The Rotary Louvre Continuous Dryer made by Dunford and Elliott Process Engineering Ltd.

CRATE HANDLING ATTACHMENT

The problem arising from the interchange of load units between suppliers and customers often gives rise to a problem with regard to the return of the empty pallets. Means of eliminating the pallet are often sought after.

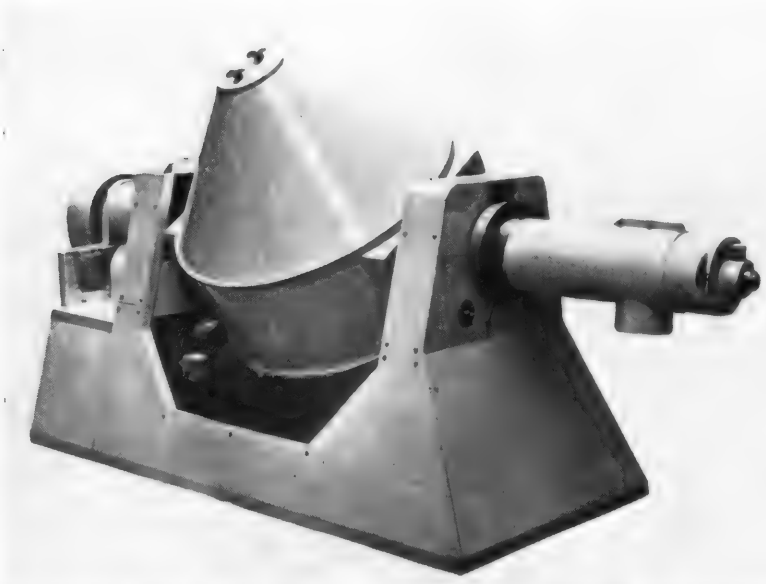
One method of eliminating pallets in the handling of bottle crates has been developed by Lansing Bagnall, Ltd. In response to a request from a customer they have devised a multi-prong fork carriage. The firm believe that the attachment is readily adaptable for the handling of all the common forms of crate in use.

WORK TABLE

A work table designed for use in industry has been introduced by Farrow and Jackson, Ltd. The table has square tube legs with a slight radius on the edges and has a hammer finish paint. The makers claim that it is both strong and easy to clean, there being a minimum of dust traps.

It is supplied with a plastic or linoleum top for use in the food industry.

The tables may be used bolted together, each unit measuring 2 ft. 9 in. square by 2 ft. 9 in. high.



The Double Conical Mixer made by Alite machines Ltd. for the continuous mixing of powders.

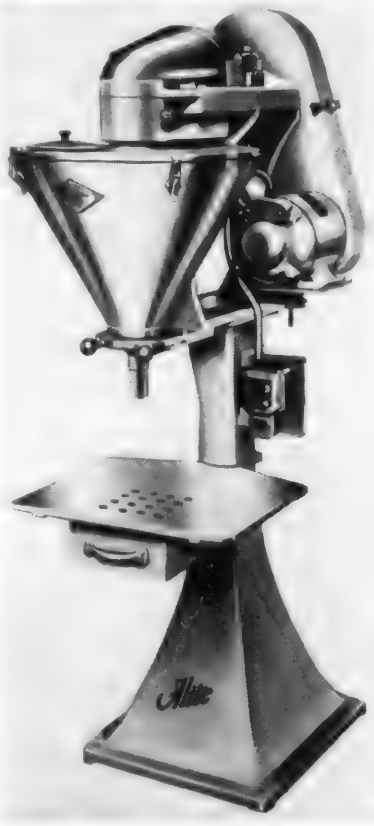
PACKAGE-FORMING UNIT

Inexpensive equipment has recently been introduced for the packaging of a wide range of foodstuffs in clear, rigid packs made from unplasticised P.V.C. The equipment is available in Great Britain from M. S. Shelley and Partners, Ltd., and consists of a compact vacuum forming machine and a high frequency welder, which are designed to be used, in conjunction with normal filling machinery, for making the pack, filling it, and then welding a lid to the pack, at rates of up to 1,500 filled and sealed packs per hr.

The equipment was first put into service two years ago at the port of Fecamp, in France, for packing fish fillets. Each pack was filled with about 14 oz. of fillets and a welder of 2·5 k.w. capacity was used for applying the lids. Even with inexperienced local labour a packing rate of about 500 packs per hr. was achieved and soon afterwards, when several industrial concerns had adopted the equipment and mechanised their production lines, it was found possible to step up the rate of packing to 800 packs per hr.

The equipment is also in use by French manufacturers for packs of olives, gherkins, capers and mustard.

Using this equipment, packs of up to about 2 lb. capacity can be produced. Virtually any shape of pack can be made, provided that one side is flat; two-component packs can be produced if required. Raised lettering, trade marks, etc., can be incorporated in the pack during the forming operation. The packs possess an inherent eye appeal which may be further enhanced by over-printing in colours. Although extremely tough they present no risk in opening or in handling when open, and they are readily disposed of when emptied of their contents. Because of the low specific gravity of the P.V.C., the packs are extremely light, and the low permeability of P.V.C. ensures that their contents are adequately protected.



The Alite loose powder Filling Machine for use with their double conical mixer.

CONTINUOUS METERING AND MIXING

The problem of accurate and speedy continuous metering and mixing of powders and the like is being overcome in many instances it is claimed by the use of standard *Alite* powder filling machines in conjunction with the double conical mixer also made by Alite Machines, Ltd.

The system is for bulk powder ingredients to be fed at an accurate rate through the *Alite* loose powder filling machine. Each machine has a variable control, adjustable from 2 lb. per hr. to 100 lb. per hr.

Each filling machine feeds its output into a common cross feed spiral conveyor which, whilst carrying the materials to the double conical mixer, also carries out a pre-mix or blend. The rotating double conical mixer mixes the materials fed to it and, as no baffles or blades are normally used, it is stated that the materials are not damaged by attrition or polarisation. The mixer is said to be easy to clean after a production run.

The input screw on the mixer extends just to the inside of the mixer and the materials fed to it fall immediately into the rotating chamber. The shaft carries on right through to the outlet where the blades of the outlet screw carry it on through to the discharge outlet. The outer case of the outlet screw is totally enclosed from the outlet of the mixer body but is extended on the inside in the form of a trough which may be adjusted to collect a stated amount of mixed material for subsequent discharge.

CAN-MAKING MACHINE

A new machine for canners, the *Besco Model 157 Body Maker*, designed mainly for the production of circular bodies of from 1½ to 7 in. diameter, and up to 8½ in. long, in tinplate up to .0125 in. thick is being marketed by F. J. Edwards, Ltd. The machine is also claimed to be suitable for producing non-circular bodies, ovals, rectangulars, etc., of suitable size, with the side seam in certain positions.

The production of the side seam hooks, the forming of the body, and the locking of the side seam are entirely automatic. The standard machine is arranged for hand feeding, but a suction feed device which includes a vacuum pump, can be supplied as an extra for notching the corners of the body blanks. A notching attachment can also be fitted and notching tools for making a 45° crop or indeed any special shape can be supplied as extra equipment.

For each change in diameter or shape of the body, an additional mandrel and wings are required.

The machine is fitted with a variable speed drive which gives a production of between 30 and 120 cans per min. The machine weighs 40 cwt. net approximately and can be shipped in a case 7 ft. × 7 ft. × 8 ft.

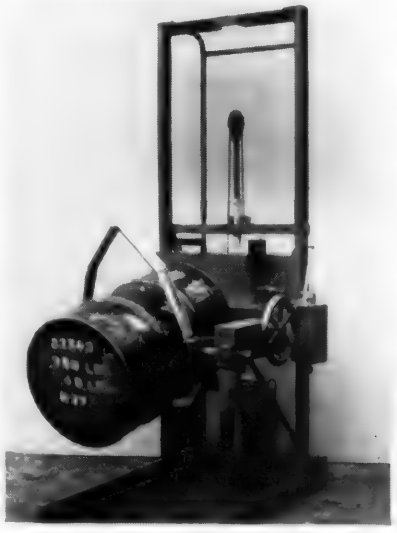
POLYTHENE BINS

Polythene bins of 50 gal. capacity, made with or without a pouring lip, are the latest addition to the range of containers now being made in this country by the Engel process. They are available in rigid or flexible polythene, and specially designed steel holders are supplied where the bins are to be moved or tilted when full. The holders are cadmium plated, but may be chromium plated, or supplied in stainless steel if required.

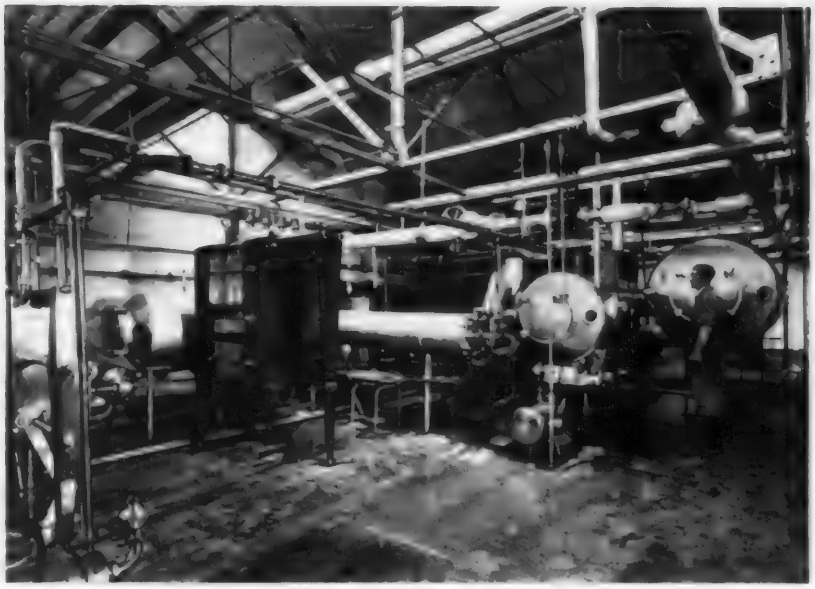
A feature of the process is said to be the low mould cost, which enables relatively small quantities of special sizes to be made economically; and extremely large mouldings can be undertaken without difficulty.

The bins are marketed by White, Child and Beney, Ltd.

The Quinell hand truck is made by Cranmer Engineering, Ltd.



The Jacacaddy truck is designed for pouring drums at a controlled rate.



APV triple effect plate evaporator in use at the Wootton Bassett creamery of Wilts United Dairies, Ltd.

ALL-PURPOSE TRUCK

What is believed to be an entirely new conception of a hand truck for the movement of barrels, drums, casks, and all kinds of shaped objects has been developed by Cranmer Engineering, Ltd.

It is known as the *Quinell* all-purpose truck and it can carry with absolute safety a load of 6 cwt.

A leading edge on the front of the cradle is tapered to allow easy entry under the object to be lifted, while a grappling hook on the handle shaft can be adjusted up and down its entire length to secure the load to the cradle.

The truck is said to be extremely robust in construction, and the wheels are made from solid, acid-resistant rubber with hardened ground bushes. According to the makers, no maintenance is required other than an occasional greasing of the wheel spindles.

The truck has a total length overall of 4 ft. 6 in., while the height overall is 2 ft. 3 in. The cradle dimension is 24 in. × 18 in. × 4 in. deep and the total weight 44 lb.

DRUM TIPPER

A new range of *Jacacaddy* trucks with squeeze clamps has been introduced by W. Langley and Co. (Mechanical Handling), Ltd. The standard model will lift drums weighing up to 5 cwt. to a maximum height of 6 ft. 6 in. and turn them through 180° at any intermediate height. These models can be adapted to take drums up to 10 cwt. and to lift to a height of 10 ft.

Hydraulically operated by hand, battery, or mains power, these trucks have been designed specifically for the operation of lifting drums over vats and pouring their contents at a controlled rate. The ability of the trucks to lift and turn materials in this way will, however, have many additional applications in general industry.

A forked lifting carriage replaces the more conventional platform of the truck and is fitted with a squeeze clamp assembly. A secondary hydraulic system with separate hand pump operates the squeeze clamp. In operation the truck is positioned to straddle the barrel or other object to be lifted. Normal *Jacacaddy* controls enable the clamps to be positioned at the required height and operation of the secondary hydraulic system closes the clamp assembly on the load. A preset valve incorporated in the system is said to ensure that sufficient pressure is exerted for efficient lifting and also that there is no possibility of damage to the load.

The load may be turned through 180° by means of a hand wheel operating a gear train mounted on the clamp assembly.

PLATE EVAPORATOR

A new A.P.V. plate type evaporator has been installed at the Wootton Bassett Creamery, of Wilts United Dairies, Ltd. This, the first installation of a plate type evaporator using three effects, was started up last July.

Designed to concentrate 1,800 gal. per hour of skim milk from 9% total solids up to 27% total solids prior to roller drying, the plant has been used for several other duties besides. During the quiet milk season, for example, it was used for the concentration of apple juice from 10-12% total solids up to 73% total solids, thus achieving a concentration ratio of between 6 and 7 : 1, although this actual plant was, in fact, only designed for a concentration ratio of 3 : 1.

News Digest

Milk firms to amalgamate

Discussions have been taking place between United Dairies, Ltd., and Cow and Gate, Ltd., as a result of which they have decided that integration would be "in the national interest" and substantial benefits could be derived from it.

Agreement has been reached in principle on the formation of a holding company to acquire the ordinary stocks of both companies, as from April 1, 1959. The basis of the offer is: six 5s. units in the new company for £1 unit in U.D. stock and eight 5s. units for 20 1s. units in Cow and Gate. The proposed basis is in line with the market values of the ordinary stocks of both firms.

Ordinary stockholders in U.D. are to be offered £1 of 6% preference shares for every £4 ordinary held, to take account of surplus funds.

The directors of Cow and Gate believe that profits for the year ended September 30, 1958, are not less than those for the previous year and the dividend will be maintained at 20%. The directors of U.D. have forecast that for the year ending March 31, 1959, the profit will not be less than for the previous year and that the dividend will also be maintained.

Mr. Leonard Maggs will be chairman of the new company and Mr. Ernest Taylor will be the deputy chairman.

The proposals are soon to be submitted to the stockholders.

It is thought that a merger should enable Cow and Gate to benefit from the large number of retail outlets of United Dairies while U.D. will gain access to the foothold in overseas markets held by Cow and Gate.

A substantial gain could probably be achieved by the elimination of duplicate creameries and factories. United Dairies also make a large amount of machinery which is used in the mechanisation of dairy processes.

Imports of butter

The Board of Trade have announced that the United Kingdom Government have reviewed the butter situation with the New Zealand Deputy Prime Minister, Mr. Skinner, as was agreed at the time of the talks last May.

Since the action taken then, following New Zealand's application under the Customs Duties (Dumping and Subsidies) Act, the market in the United Kingdom for New Zealand butter has changed and prices have risen.

In the present condition of the market the United Kingdom Government are withdrawing their requests to the Governments of Sweden and Finland to limit their exports to the U.K. The Government of the Irish Republic has been informed that the arrangements made with them in regard to further consultations can lapse.

In addition, the Open General Licence has been amended to remove the restriction on imports from Belgium, and discussions are being held with the Government of Poland about future arrangements for imports from them.

If at any future time imports of subsidised or dumped butter should assume such proportions as to cause or threaten material injury to New Zealand producers, action could again be initiated in respect of such imports under the Act.

The Government have given Mr. Skinner their assurance that they would deal expeditiously with an application in the light of the requirements of the Act.

Leading scientist to open corrosion exhibition

Protecting hundreds of millions of pounds worth of Armed Forces' equipment against corrosion damage is a major task of Ministry of Supply scientists. It is appropriate, therefore, that the V.I.P. who will open Britain's 1959 Corrosion Exhibition on Monday, April 27, is the Chief Scientist of the Ministry of Supply, Sir Owen Wansbrough-Jones, K.B.E., C.B., Ph.D., F.R.I.C.

Sir Owen, who runs one of the biggest scientific organisations in the country, was trained as a physical chemist at Cambridge under Sir Eric Rideal and at Berlin under Fritz Haber. Soon after the war started he was in the Army, working on chemical warfare, but the scope of his work widened to embrace a variety of scientific and technical matters which he tackled as a General Staff Officer. He became Scientific Adviser to the Army Council in 1946. In 1950 he transferred to the Ministry of Supply as Director General of Scientific Research in respect of Army requirements and two years later was promoted to Chief Scientist.

Among his many outside interests, Sir Owen is Treasurer of the Faraday Society, a body which has done much for the study of corrosion, and, at the other end of the scale, he is concerned with practically the only field of metallurgy in which corrosion is no problem —the noble metals; he is a member of the Court of Assistants of the Goldsmiths' Company.

Over 70 firms are showing at the Corrosion Exhibition which will be open for four days, April 27-30, at the Royal Horticultural Society's New Hall, Westminster. Tickets are available from the organisers, "Corrosion Technology," Leonard Hill House, Eden Street, London, N.W.1.

Quick-freezing Association

A new association to represent the quick-freezing industry, the National Association of Frozen Food Producers, has been formed by the merger of the former National Association of Quick-Frozen Food Processors and National Federation of Fish Quick Freezers.

The merging of the two existing associations is a step towards effective representation, particularly since most members of both associations had come to have a foot in both camps. It is intended that the association shall have four commodity divisions: fruit and vegetable; fish and fish products; carcase meat and poultry; and pre-cooked and specialities.

Approved oxidising agents

The Minister of Agriculture, Fisheries and Food in accordance with Regulation 26 (6) (*a*) of the Milk and Dairies Regulations, 1949, as amended, has approved further products for the cleansing of milk tankers, vessels or appliances as an alternative to scalding with boiling water or steam.

The description of the products and the names and addresses of the vendors are as follows: *Pep*, The British Extracting Co. (Sales), Ltd., Dock Road South, New Ferry, Birkenhead, Ches.; *Leda Detergent-Steriliser LS3*, Leda Chemicals, Ltd., Eley Estate, Angel Road, Edmonton, London, N.18; *Bibby Detergent-Steriliser*, J. Bibby and Sons, Ltd., King Edward Street, Liverpool, 3; *Circosan*, Gascoigne Crowther, Ltd., Lactosan Laboratories, Caversham, Reading; and *Lactosan "66" (Mark II)*, Gascoigne Crowther, Ltd., Lactosan Laboratories, Caversham, Reading.

Bakery scholarships

Regulations for the Joint Scholarship Scheme for 1959 are similar to last year. It is pointed out that scholarships are only available to students resident in England and Wales. Application forms must be sent in not later than March 21, together with registration fees. Application forms will be sent upon request.

Examinations will be held on April 21 at various centres commencing at 2.30 p.m.

Food Standards Committee

The terms of reference of the Food Standards Committee, set up in 1947 to advise ministers on regulations to control the composition of food for the protection of consumers. The committee's terms of reference have now been revised to take account of recent changes in food and drugs legislation and in departmental responsibilities.

The new terms of reference will give the committee more scope to consider and recommend on the control of food labelling and advertising; previously the Committee could only deal with the labelling of foods for which standards of composition were prescribed. Another change is that liquid milk is no longer excluded from the terms of reference, but the committee will not be asked to deal with any aspect of milk before the Committee on the Composition of Milk has reported.

Change of address

The Sales Department of B. Young and Co., Ltd., has been transferred from Grange Road, S.E.1, to: Imperial House, 15-19, Kingsway, London, W.C.2. Telephone: Temple Bar 7777. The Company's accounts department remains at: 96, Bridge Road East, Welwyn Garden City.

Packaging advice

A technical committee which can assist industry in its packaging problems has been formed by the National Federation of Box and Packing Case Manufacturers. Both the Printing, Packaging and Allied Trades Research Association and the Timber Development Association are represented on this committee (the Research and Development Committee).

It has been set up with the object of providing advice and information on all technical matters relating to the design and specification of timber and plywood cases and pallets.

Insecticide approved

The use of *Malathion* to protect stored foods against insect damage has now been officially accepted by the Ministry of Agriculture. Malathion, developed by Cyanamid, is safe to humans and animals but highly lethal to insect pests. Its use for stored food protection has already been approved by the American and Canadian governments.

Preventing the loss of as little as $\frac{1}{4}\%$ of the 17 million tons of grain and oilseeds used annually in Britain, and worth over £400 million, would save the nation at least £1 million.

In the major producing and stockpiling countries such as America, Canada, India, Argentine, and Australia, the potential savings are much greater. It is estimated that a world surplus of 50 million tons of wheat alone is being held in long-term storage.

Under the new regulations the Ministry permits the addition of 10 oz. of Malathion per 1,000 bushels of any grain or oilseed. The insecticide can be mixed as a powder or liquid with the grain or sprayed on to bags, the walls of storage silos, and ships' holds. Costs are as low as 4d. per ton of treated grain.

Production began in January of a series of new vehicles in the Thames Trader range made by the Ford Motor Co., Ltd. One of the models is shown: the range consists of a low frame chassis and chassis cabs from 30 cwt. to 5 tons equipped with either 4 cylinder petrol or diesel as required. The frames of the models are arched over the rear wheel and this, together with specially designed springs, permits the frame height to be 9 in. lower than on the present chassis, which is being continued.

OBITER DICTA

● An ice cream company announces a sale. Drastic price reductions on unfashionable flavours. One U.S. gallon: two dollars (14s. 4d.).—*American correspondent, Daily Express.*

● Sandwiches served in the economy class North Atlantic flights cost about £2 10s. "Simple and inexpensive sandwiches" were decreed by the International Air Transport Association.—*Evening News.*

● "Scotch remains English, champagne should remain French" is the slogan under which the Whiskey à Gogo chain of bars in Paris have launched their protest against the recent British court decision in the "Spanish champagne" case.—*The Times.*

● Is it an established law of thermo-dynamics, or whatever the technology is, that whenever a cake is baking in the oven no door or window in the house may be opened and everyone must move about the house on tiptoe?—*George Schwartz, Sunday Times.*

● I reckon that the milk business is the best for fighters. You work early in the morning and have time to train in the afternoon. Mind you, I am not advertising it too much. I don't want to have too many milkman-fighters as opponents.—*Percy Lewis, boxer.*

● "Personalised grapefruit" is now offered for the breakfast tables of discriminating Americans. In the words of the company's advertisements, this is how the scheme works: "We'll pick the fruit as it ripens, stamp with your initials, ship to you prepaid. You'll get the top of the crop—a guaranteed 125 Aurora grapefruit, touched with the blush of dawn, as sweet as springtime. You'll receive 40-45 fruit every month for the next three months.—*Daily Telegraph.*

● Senator Dworshak, Republican, Idaho, whose work naturally includes defence of the potato, is demanding that the Federal Trade Commission take action on a rice company's television commercial saying rice has less calories than potatoes. The rice promoters' "food fable has no place on the American television screen," Senator Dworshak declared. "I would advise weight watchers not to watch TV, but to continue to eat potatoes to keep slim and trim.—*Daily Telegraph.*

PEOPLE

MR. D. R. GENTLE has been appointed a director of Union Food Machinery and Equipment, Ltd.

▪

MR. ERIC L. KIDD has been appointed to the executive staff of S. Daniels and Co., Ltd.

▪

MR. STANLEY L. MAUGHAM has been appointed a director of the Maypole Dairy Co., in place of MR. DUNCAN N. GILLIES who has retired from the board.

▪

MR. JOHN G. NUTMAN has been appointed to the board of Foster Clark, Ltd., as sales director. Mr. Nutman joined the company nearly two years ago to take charge of the sales division, having previously occupied a similar position with another firm of food manufacturers.

▪

MR. B. W. SCHWARZ has left the Yarmouth factory of Birds Eye Foods, Ltd., to take up a senior appointment in the audit department in London. He was in the Unilever audit department before joining Birds Eye.

MR. F. G. KENBER, factory general manager at neighbouring Lowestoft, has taken over as factory general manager at Yarmouth.

MR. T. G. N. CRAWFORD, production manager at Grimsby has moved to Lowestoft as factory general manager.

MR. A. C. MANN, who joined Birds Eye from Joseph Crosfield and Sons, Ltd., is now production manager at Grimsby.

▪

MR. H. J. C. SCHULTEN, production manager at the Bromborough Margarine Works of Van den Berghs and Jurgens, Ltd., retired on December 17.

One of the foremost experts in margarine manufacture, Mr. Schulten has been associated with the margarine industry for nearly 50 years.

He started his career in 1900 with N. V. Anton Jurgens at Oss in Holland, and 9 years later joined N. V. Rolf V. d. Baumen, Leeuwarden, Holland, as production manager. From 1920-1 he was responsible for the coordination of margarine manufacture within the four Rhineland Jurgens' factories.

After two years as production manager at Van Rossum and Co. G.M.B.H., Emmerich, Germany, he joined Jurgens, Ltd., at Purfleet, as shift manager.

For the past 27 years Mr. Schulten has, on separate occasions, been production manager at the Bromborough and Purfleet Works of Van den Berghs and Jurgens, Ltd.

Mr. C. L. Hinton

Mr. J. G. Nutman

Mr. S. W. Smedley

MR. C. L. HINTON, superintendent of research of the British Food Manufacturing Industries Research Association, retired at the end of 1958 after more than 38 years' service. He was one of the first members of staff recruited by the late Mr. T. Macara, F.R.I.C., when the laboratories of the British Association of Research for the Cocoa, Chocolate, Sugar Confectionery and Jam Trades were opened in 1920. Mr. Hinton's published work on the composition of fruits and jams, on the analysis of foods containing sugars and on pectins is well known, and his monograph on pectins was issued by the Department of Scientific and Industrial Research. Mr. Hinton is also an authority on food legislation throughout the world.

▪

MR. WILLIAM J. BATCHELOR, former general sales manager of Batchelors Foods, has joined the Smedley Group of companies as sales controller for the frozen foods division.

▪

MR. L. F. MATTHEWS, who has 48 years' service with the Bovril, Virol and Ambrosia Companies, has retired from the managing directorship of Virol, Ltd. He continues as chairman of Ambrosia, Ltd.

▪

MR. J. S. A. HODGE, F.A.C.C.A., F.T.I.I., has been elected chairman of the Bennis Combustion, Ltd., and MR. B. W. DAWKINS has been appointed managing director. MR. C. J. HEREFORD, M.I.H.V.E., M.INST.F., has been appointed a director of the company.

▪

MR. JAMES HALLORAN, foundry manager, of Follsain-Wycliffe Foundries, Ltd., was presented with a pierced silver sweet dish on his retirement after 24 years' service with the company. Mr. H. M. Jones, F.C.A., chairman, made the presentation on behalf of the directors. A portable radio was presented by Mr. J. R. Binley, chief metallurgist, on behalf of the staff, at the works annual dinner attended by nearly 200 works and staff employees, held in the new works social centre and canteen.

On his retirement Mr. Halloran will have completed 50 years' service in the industry.

OBITUARY

SAMUEL WALLACE SMEDLEY, died at his Knightsbridge home recently. He was 82.

Mr. Smedley became manager of a fruit buying firm in Wisbech, Cambs., at the age of 19.

Having gained much useful experience he opened his own business in Wisbech and later in Evesham and London, supplying fruit to jam makers and vegetables to retailers, caterers, and large stores. The firm was founded on £200 saved from his earnings. In the same year, 1904, he married Gertrude Edith Venables.

The business prospered and during the first world war he was made Fruit Controller at the Ministry of Agriculture.

In 1919 he felt he had earned a holiday and went to the United States with his wife. There his interest as a fruit merchant was aroused by a first sight of America's expanding canning industry. He subsequently brought £6,000 worth of machinery back to England and started what was to become the £5,000,000 National Canning group of companies. The site of the new enterprise was a disused factory at Wisbech, and on the day it opened its doors his son, the present chairman, Mr. Wallace Smedley, joined the staff straight from school.

His firm undertook the production for the first time in Britain of quick frozen fruits and vegetables in 1938. S. W. Smedley had first shown interest in this new field as early as 1936.

A life long interest in agriculture caused him to acquire substantial holdings of land in Scotland between the early thirties and the late forties. It was a source of some pride that he could claim to grow more raspberries than anyone else in the British Isles. These Scottish farms subsequently became the basis of a trust for his grandsons.

In 1940, Mr. Smedley resigned from active office as chairman and managing director of Smedleys, Ltd., but retained his position as chairman of the holding company until 1953 when he resigned in favour of his eldest son.

The following year, at the age of 78, he set up a new canning company in sunny, unsettled Cyprus.

MR. WILLIE PORTEUS, joint managing director of George Porteus and Sons (Leeds), Ltd., died on November 25. Mr. Porteus, who was 68, was the second son of the founder of the company.

He joined the firm after completing his education, and for many years, up to the time of his death, was managing director. During his lifetime he was responsible for a number of patents applicable to the brewing, malting and corn milling trade.

■

DR. W. N. STOKOE, PH.D., B.SC., F.R.S.E., F.R.I.C., a former assistant general works manager of the Bromborough Stork Margarine Works of Van den Berghs and Jurgens, Ltd., died at his home in Edinburgh on December 10 at the age of 65. He had been associated with the industry for 38 years.

He commenced his career in 1918 as a research chemist with Craigmillar Creamery Co., Edinburgh, and two years later became works manager. In 1932 he was appointed technical director of the company, a post which he held until the Edinburgh factory closed in 1948.

Dr. Stokoe then joined the Bromborough works of Van den Berghs and Jurgens, Ltd., as a member of the management committee and three years later was appointed assistant general works manager. He retired in March, 1957.

During the war, Dr. Stokoe was additionally responsible for production at the Ballochmyle Creamery and was appointed technical officer of margarine production for the Ministry of Food in the Edinburgh and Glasgow areas.

■

MR. J. C. B. CRASKE died in Liverpool on December 5. He joined the staff of George Payne and Co., Ltd., over 30 years ago, on the chocolate side of the business.

At the outbreak of war he took over responsibilities for all chocolate and general confectionery as sales manager until his severe illness in the latter half of 1957. When he recovered it was decided that he should concentrate on the chocolate couverture side of the business as sales manager. He has represented the company on the various groups of the Cocoa, Chocolate and Confectionery Alliance and other trade organisations.

Mr. Craske leaves a widow and daughter.

Food industry honours

The New Years Honours list included the award of the O.B.E. to MR. C. H. CHALMERS, chief food and dairy officer of the Department of Health for Scotland and MR. J. M. HAY, senior principal officer of the Ministry of Agriculture, Fisheries and Food's Research and Experimental Factory, Aberdeen.

Slaughterhouse hygiene

New regulations have been laid in Parliament by the Mnister of Agriculture, Fisheries and Food and the Minister of Health about hygiene in slaughterhouses. Their purpose is to ensure the production of clean meat; and they include many requirements about how slaughterhouses shall be constructed and equipped, how they shall be kept clean, precautions to be taken with animals and meat that may be unfit, personal hygiene for those working in slaughterhouses and disposal of unpleasant by-products.

New slaughterhouses have to comply from January 1, 1959, with all these requirements. But existing slaughterhouses do not have to comply with the regulations about construction until dates to be agreed between the Minister of Agriculture, Fisheries and Food, and the local authority under a procedure laid down in the Slaughter-Houses Act, 1958.

The Minister of Agriculture, Fisheries and Food has also laid the Slaughter of Animals (Prevention of Cruelty) Regulations, 1958, which comprises the 1954 regulations of that name with some amendments and additions. The purpose of these regulations is to secure humane conditions and practices in connection with the slaughter of animals at slaughterhouses and knackers' yards. The most important change made is that all adult cattle must be killed in a stunning pen.

New slaughterhouses and knackers' yards will have to comply with all these regulations also from January 1, 1959; but existing slaughterhouses and knackers' yards will not have to comply with new regulations entailing construction until later dates.

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Change of address

British Soya Products, Ltd., have moved their head offices and laboratories to: The Grange, Puckeridge, Herts. Tel: Puckeridge 291-3.

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Scottish office

Mr. R. G. C. Smith, the Pig Industry Development Authority's senior officer in Scotland, has moved to new offices at 17, Rutland Square, Edinburgh 1. Telephone: Fountainbridge 8370.

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Food marketing firm

Regent Foods, Ltd., has taken over the marketing of the range of Regent quick-frozen foods from Smethursts Foods, Ltd.

Within only twelve months there have been dramatic developments and a rapid expansion in the range and the marketing of this new brand of quick-frozen foods.

Quite apart from its vegetable and fish products Regent also makes a contribution to the range of ready prepared food now being quick-frozen.

Erections and Extensions

K. Jackson, Ltd., are having a £22,000 bakery constructed at Aylesbury, Bucks.

■

Newcastle Breweries, Ltd., are extending their brewery in Corporation Street, Newcastle-on-Tyne.

■

Swift and Co., Ltd., are planning to have a cold store erected at Abattoir Road, Blackpool, Lancs.

■

Sansinena Meat Co. have had plans approved to build a meat depot at 65-69, Bernard Street, Southampton.

■

H. C. Herman, Ltd., are having a warehouse extension built at their food factory in St. James' Street, Hull.

■

Associated British Maltsters, Ltd., are having a factory built at Wellingford, at a cost of £50,000.

■

Joseph Stocks and Sons, Ltd., are having a bacon and meat processing factory built at Stanley Street, Manchester.

■

Oxo, Ltd., meat extract manufacturers, are having warehouse and office premises built at Bristol, at an expenditure of £40,000.

■

Albert Bosomworth, Ltd., Ideal Bakery, Neville Road, Bradford, Yorks., are planning to have a bakery erected at Perry Lane, Bradford.

■

J. Gasman Brothers, Ltd., cardboard box manufacturers, are having an extension built to their factory in Selinas Lane, Dagenham, Essex.

■

Beaulahs (King's Lynn) Canners, Ltd., have had plans approved to erect an extension to their food canning factory at The Docks, King's Lynn, Norfolk.

■

William Grant and Sons, Ltd., have been granted permission to convert a textile mill at Paisley, Scotland, into a distillery, equipped with blending and bottling plant, and bonded warehouse.

■

C. Kunzle, Ltd., Five Ways, Birmingham, 15, have acquired a site at Garretts Green Lane, Garretts Green Industrial Estate, Birmingham, for the erection of factory, office and warehouse premises estimated to cost £250,000.

The first installation of an addition to the Frigidaire Manhattan display case range was made at the Premier Supermarket at Croydon which was opened recently. To be known as the Superama, this three-tier refrigerated case is available, like the other standard Manhattan cases, in a number of standard lengths. The case illustrated is 24 ft. long and provides the Premier Supermarket with 72 ft. of refrigerated display for dairy produce.

Mushroom spawn

Fundamental research in being carried out by Dr. R. Klein in the laboratories of W. Darlington and Sons, Ltd., which will materially contribute to the future progress of the mushroom industry.

Strains of spawn, obtained from world-wide sources and strains, produced in their laboratories, have been tested in farms on the Sussex coast, and from the three most promising they are now producing further material for larger scale trials for testing under as varied conditions as possible. For this purpose they are enlisting the co-operation of growers in all parts of Britain to carry out trials on a statistical basis. With such comparative data it will be possible to determine the best strain or strains for specific conditions.

Shetland fish plant

A new white fish processing plant capable of taking up to 18 tons of ungutted white fish daily is being proposed for Scalloway in Shetland. The Shetland Fishermens Association is giving full support to the project.

Salmonellae amok

In our January Editorial Comment, under the heading "Salmonellae amok" we referred to "17 outbreaks caused by canned peas."

It has been brought to our notice that the outbreaks concerned were caused by Staphylococcus aureus and not Salmonellae.

Sales agents

Bowmans Chemicals, Ltd., have announced that Henderson, Hogg and Co., have been appointed as sole selling agents for the sale in Scotland of their lactic acid and calcium lactate; also sulphonated oils and other chemicals.

Writing a book?

The Leonard Hill Technical Group, publishers of FOOD MANUFACTURE invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance to:

The Manager,
Leonard Hill (Books) Ltd.,
Leonard Hill House,
Eden Street,
London, N.W.1.

Leonard Hill are specialists in industrial, technical and scientific books. They have a reputation for vigorous and successful promotion of their books by extensive advertising and maintain a world-wide selling and distributing organisation.

Forthcoming Events

Society of Chemical Industry

Food Group

February 4. Nutrition panel meeting. Practical implications of the laboratory evaluation of protein. By Dr. G. D. Rosen. 14, Belgrave Square, London, S.W.1, 6.15 p.m.

February 5. Joint meeting with the Newcastle section. Recent research at the Brewing Industry Research Foundation. By Dr. A. H. Cook. King's College, Newcastle.

February 25. Joint meeting with the Microbiology Group. Cheese manufacture and microbiology—technological and microbiological aspects. L. J. Walker and D. Mabbit. 14, Belgrave Square, London, S.W.1, 6.15 p.m.

Institute of Refrigeration

February 5. Thermoelectric cooling. By J. Goldsmid. The Institute of Marine Engineers, The Memorial Building, 76, Mark Lane, London, E.C.3.

Society for Analytical Chemistry

February 4. The estimation of pesticide residues. By E. Q. Laws, J. G. Reynolds and M. G. Ashley. Meeting Room of the Chemical Society, Burlington House, Piccadilly, London, W.1, 7 p.m.

Company Profits & Prospects

Lessening demand for drives

The annual report of J. H. Fenner and Co. (Holdings), Ltd., reveals that J. H. Fenner and Co., Ltd., have had a difficult year for trading. There has been a lessening demand for mechanical power transmissions to be fitted to new machinery in this country, and overseas markets have been shrinking faster than new markets have been opening up. Nevertheless, the report expressed satisfaction at the results which had been achieved.

The consolidated net profit of the group amounted to £486,118 for the year ended August 31, 1958, compared with £449,593 for the previous year. The directors recommended a dividend of 15%, less tax, on the ordinary capital.

*

Capital increase

The board of Van den Berghs and Jurgens, Ltd., announce that it is proposed to increase the authorised and issued capital of the company from £8,637,500 to £10,387,500 by creating and issuing 7,000,000 additional Ordinary shares of 5s. each (£1,750,000).

All the existing ordinary capital is beneficially owned by Unilever, Ltd., who will also become the beneficial owners of all the new ordinary capital.

The old and the new in delivery fleets is seen here in the line up of vehicles possessed by Dring's, Ltd. On the left is the fleet of quite a few years ago, while on the right is their up-to-date range of delivery vehicles. All these Morris vehicles were supplied by Stewart and Arden, Ltd. The latter are Morris L.D.2 vans.

Co-op sales up

At the quarterly meeting of the United Co-operative Baking Society in Glasgow recently, Mr. James Lang, J.P., president, said that sales for the year ended October 4, 1958, amounted to £7,874,095, which showed an increase of £25,637 compared with the previous year.

Referring to the drop in the consumption of bread, he said that the society's decline in bread sales was only half of the national rate of 8%, but they were concerned about it. In recent weeks loaf-bread sales had improved, and a number of societies were sharing in the increase.

They had had great hopes of exceeding a million pounds in sales from the Clydebank biscuit bakery for the 6 months, he added, but the total was £980,000—6.3% above sales for the corresponding period of 1957.

Cold store for ice cream

Supplementing the manufacturing facilities which already exist at Craigmillar, near Edinburgh, T. Wall and Sons (Ice Cream), Ltd., have planned the construction of a new cold store adjacent to the main factory.

The internal dimensions of the proposed store are: length 153 ft. 10 in.; width 93 ft. 5 in. and height 20 ft. which will give a total cubic capacity of 400,000 cu. ft. The store will operate at temperatures down to −20°F.

Smiths Insulations, Ltd., well-known cold store designers, have been appointed as main contractors and will be responsible for all building work, steelwork, the cold store and outer cladding. Their normal prefabrication technique of all structural units will be used so that quick assembly on site can be carried out.

Insulation will be achieved by 12 in. cork and the *Minikay* dehydration system will be incorporated on the inner layer. The store will be air cooled, using *Lightfoot* equipment.

NEWS FOR IMPORTERS

Import Quotas for 1959.—In Notice to Importers No. 888, dated December 10, 1958, the Board of Trade invite applications for licences under the "global" quotas for 1959 for goods still subject to the restrictions imposed in November, 1951, and March, 1952. The quota values have not yet been determined but will be announced as soon as possible.

The quotas are for imports over the whole calendar year, except in the case of fresh pears where the quota is for the first 6 months of 1959.

Composite Sugar Products Surcharge.—The Minister of Agriculture, Fisheries and Food has made an Order replacing, from January 1, 1959, the Composite Sugar Products (Surcharge—Average Rates) Order, 1958, as amended, which prescribed the surcharge payable in respect of sugar or molasses contained as ingredients in certain imported composite sugar products.

The new order, the Composite Sugar Products (Surcharge—Average Rates) (No. 2) Order, 1958, (S.I. 1958, No. 2139), re-enacts substantially the same provisions and the same rates of surcharge, but in terms appropriate to the revised classification of goods prescribed in the Customs Tariff, 1959, operative from January 1, 1959.

The Order also prescribes, for the first time, an average rate of surcharge of 7s. 6d. per cwt. for "sweetfat" (mixtures of edible fats and sugar).

Preservatives, etc., in Food.—The Minister of Agriculture, Fisheries and Food and the Minister of Health, acting jointly, have made the Public Health (Preservatives, etc., in Food) (Amendment No. 2) Regulations, 1958. These regulations permit the importation and sale of apples, pears, pineapples, peaches and melons, and articles of food containing any such fruit, which contain ortho-phenylphenol within prescribed limits.

"The White Sheep of the Family"

Members of the staff of W. J. Bush and Co., Ltd., and their guests gathered recently at the Palmerston Restaurant, Bishopsgate, London, E.C.2, for an informal reception and dinner. Afterwards, the party saw a performance of "The White Sheep of the Family," by Ian Hay and L. du Garde Peach, given by the Bush Dramatic Society. The large audience was well and truly entertained by the story of the son of a family of crooks who "lets the family down" by trying to go straight when he falls in love with the daughter of the Commissioner of Police; he is "redeemed," however, when the young lady turns out to be an expert crook; she is therefore acceptable to the family and the son can return to his forgery activities without any qualms of conscience.

A polished and convincing portrayal of James Winter, J.P., the head of the crooked family, was given by Julian Pearson. Rhoda Wright played his unassuming yet equally crooked wife, and their sophisticated, wayward, and charming daughter was played by Zena Wiltshire. The part of the maid, Janet, was taken by Pauline Whetstone; her portrayal of the novice in crime, eager to learn but always making awkward mistakes, was realistically done. Walter Oakley made a convincing Commissioner of Police, whose daughter Angela, played by Christine Harwin, is the betrothed of young Peter Winter, the "White Sheep," played by Percy Hogg; the two principal players rose to the occasion. Mr. Eric Bush, the Chairman of the Company, gave an excellent rendering of the absent-minded Vicar whose continual and rather unwelcome visits to the Winter household give the family some embarrassing moments but the audience many laughs. Sam Jackson, the cockney "fence," an important business associate of Winter Senior but socially sometimes slightly unacceptable, was well portrayed by John Cox.

Packaging

(*Left*): The Vari-Clip closure for polythene bags is made by Sealdraught, Ltd. It is adjustable and is supplied in four colours. (*Right*): The Big Six carton for Marks and Spencer is supplied by Boxfoldia, Ltd. (*Below*): Cellophane is used to bundle these seasoning bags marketed by Alfred Button and Sons, Ltd.

Plastic closure

An inexpensive, British-made, adjustable plastic closure for polythene and other film bags, the *Vari-clip*, is now being marketed by Sealdraught, Ltd.

The clip, which is available in 4 colours, is 2¼ in. long, has 4 square holes at one end and a toggle at the other, which make it adjustable to any one of 4 diameters. The smallest diameter the clip will make is approximately ¼ in., and the largest approximately 9/16 in. The bag to be closed is simply laid across the clip and the toggle twisted through the appropriate hole.

The closure made in this way is said to be ideal for packing fresh foods such as fruit and prepared vegetables. It can also be used for dry or non-perishable goods where a completely airtight seal is unnecessary.

It is pointed out that the clips are low priced: 5,000 cost 25s. per thousand, while the cost of 100,000 works out at 15s. per thousand. The makers say that the small packer can seal his products attractively at a low cost without buying a sealing machine.

Poultry bagging machine

The Metal Box Co., Ltd., is marketing a new machine for inserting poultry into *Diothene* bags. The resulting tight pack provides a clear view of the bird. Another advantage is the shorter freezing time required, by comparison with loose-wrapped birds, because of a reduction in the amount of air trapped inside the bag.

The *Raptite* Poultry Bagging Machine is claimed to be rapid in operation; it consists of a tapered funnel, the separate sections of which can be expanded by means of compressed air controlled by a foot-pedal. The operator first places a bag on the narrow

end of the funnel. The bird is then placed in the wide end. The narrow end is expanded by pressing the pedal and passes the bird through into the stretched bag, the result being a tight wrap.

Closing the pack is a separate operation which can be done by staple, adhesive tape, wire tie or heat sealing.

Smaller bags can be used than with loose wrapping, giving a substantial saving in wrapping materal.

Self-erecting cartons

Marks and Spencer, Ltd., were responsible for the new designs of the St. Michael cartons. Both cartons are in four printings, produced by Boxfoldia, Ltd. The big six has red and yellow as predominating colours.

The Swiss Rolls carton is *Formfast* style (self-erecting) and has a chocolate glassine lining, wax-laminated to the inside of the carton board. A light blue background throws up the illustration of the chocolate covered Swiss Roll.

Frankfurter pack

Drings, Ltd., are now producing their 5 in. long Frankfurter sausages in packets, each containing five.

The sausages are placed on a white backing board printed with suggestions for serving. The board and the sausages are then overwrapped with *Saran* film imported from America by Dewey and Almy, Ltd. The film is heat-sealed on the base of the pack and then shrunk in a heated tunnel, which pulls it taut overall and, it is said, gives a better appearance.

According to the makers, the film is substantially air and moisture proof and offers great flexibility.

The Metal Box Raptite machine for inserting poultry into Diothene bags.

New biscuit pack

New sales appeal and factory-freshness are said to have been given to the medicinal and special health biscuits marketed by R. M. Scott (Ipswich), Ltd., by the introduction of a Saran-coated cellulose film pack, printed in solid colours of red, green and white.

Scott's health biscuits, which require a high degree of moisture protection, were formerly sold in tins. However, with modern selling conditions and the current emphasis on display appeal, it was decided that a new pack was desirable which was more eye-catching and striking in character. At the same time, it was felt that another packaging material might be employed which would prove more economical while still providing ample protection.

As a result, an attractive and hygienic-looking satchel-type bag has been designed and produced by the packaging firm of Robinsons of Bristol, which is made from Sidac's 400 gauge Saran-coated film (known as M.X.X.T.). This has been found to meet all requirements, as it provides excellent moisture and odour protection and can be reliably heat-sealed at normal operating temperatures (around 130°C.) to ensure a highly efficient pack. Apart from giving the biscuits longer shelf-life than earlier types of coated film, *Sidac M.X.X.T.* film is also understood to provide improved resistance to handling by virtue of the increased strength of the heat-seal closure. Resistance to oils, and greases and abrasion are among the other features of this composite material, which can be handled by ordinary heat-sealing wrapping machine.

The Proctor and Gamble Big Top peanut butter jars may be used as glasses after they are emptied.

Sauce bottle label

A new label for H.P. Sauce, redesigned by Richard Lonsdale-Hands Associates, Ltd., for H.P. Sauce, Ltd., still contains the familiar description of contents in English and French.

Despite this, the branding is described as bigger and brighter than before. A red band is included on the branding panel which now continues around the sides of the bottle. The panel itself has been placed lower on the label to balance the design.

The overall colour remains light blue, but now bled to the sides, and the traditional view of the Houses of Parliament is retained.

The new label for H.P. Sauce was designed by Richard Lonsdale-Hands Associates, Ltd.

Spice bulk-wrap

By adopting a *Cellophane* film bulk-wrap in place of a printed display-carton for their 1-oz. drums of herbs and spices, Alfred Button and Sons, Ltd., are said to have cut packaging costs and more fully exploited the display possibilities of the products.

The colourful labels on the drums (12 to a pack) are clearly visible through the transparent film wrap which needs no further printing. Stock-checking is easy and the complete pack is an attractive display piece that the retailer can put straight on to his shelves.

The wrap, suggested by British Cellophane's Technical Service Department, is of *MSADT-type Cellophane* film, which has a moistureproof coating on one side only. The uncoated surface is on the outside of the pack, so that gummed paper can be used for sealing (gummed paper will not stick properly to a coated surface).

The design of this Viskase Zephyr casing is carried out in blue and yellow.

Easter design for hams

Viskase, Ltd., are offering free printing of their special Easter design on *Zephyr* ham casings on orders placed on or before February 19. Processors will thus be able to obtain printed casings at the basic cost of the clear casings.

Printed in blue and yellow the design incorporates a chicken rising from an egg with daffodils and a butterfly. The chicken's beak leads the eye up to the word Easter, while the type of meat enclosed—Cooked Ham or Cooked Shoulder—is printed across the egg.

Peanut butter jars

Peanut butter marketed in glass jars which look like crystal is being marketed by the American firm of Proctor and Gamble, Inc.

The glasses are traced in such a manner that they have the appearance of expensive glassware. They can be used for wine after they are empty and are said to look the part when placed on the dining table.

It is estimated that the extra cost of packaging will be amply met by the increased sale.

Picnic pack

Cellulose film is currently helping the picnic-planning family to solve the age-old problem of open-air tea-making.

By overwrapping their recently introduced experimental Picnic Packs—18 tea bags and 18 Tate and Lyle sugar packs in a carton—in a transparent moistureproof *Cellophane* film, Joseph Tetley and Co., Ltd., intend that the contents remain fresh until required for use and also that the pack catches the eye of the holiday minded housewife.

Cellophane film is also used as the protective wrap for the individual sugar packs.

Food News Overseas

Iran sugar refineries

The Iranian Plan Organisation has approved plans for the extension of sugar refineries at Abkuh and Chenaran from 650 to 1,300 tons and from 350 to 700 tons respectively.

Nyasaland cocoa experiments

The Department of Agriculture has been experimenting with the growing of cocoa in Nyasaland, states Barclays Bank D.C.O.'s "Overseas Review." Early growth at the Makanga experimental station has been excellent, although it will be several years before the final results of the experiment can be assessed.

Natal sugar plant

The South African firm of Hulett and Sons, Ltd., is associated with the Corn Products Refining Co., of New York, U.S.A., in the establishment of a new £600,000 company known as Refined Sugars and Syrups (S.A.) (Pty.) Ltd., which, initially, will be concerned in the production of refinery-packed, highly-refined domestic sugar, the whole process undertaken by machinery, much of it automatic. Sugar cartons of a type new to South Africa will be introduced for the marketing of small packets for the domestic market.

The new plant now being provided at Rossburgh, Natal, is next to the large Hulett refinery there, and among the modern automatic plant and machinery are advanced types of electronic control equipment.

Panamanian canning developments

The United States firm, Famous Foods, manufacturers of *Libby* products, have established a fruit canning plant under the name of Conservas Panamenas Selectas, in conjunction with the Panamanian firm of Tagaropulos, S.A.

The National Economic Council, in granting the contract which would entitle the company to import tins duty free and enjoy tariff protection, were under the impression that the company would use locally grown fruit. It transpires, however, that Libby's propose to send fruit pulp to the Panamanian firm for processing. Another Panamanian company which makes fruit juice from home grown fruit has consequently opposed the granting of the contract. It is also reported that the Nestle Co. propose to start the production of fruit juices from locally grown fruit in their factory at Nata.

Polish sugar factory

The first sugar factory to be completely equipped from Polish factories is under erection at Ostrowite, Poland. The turbine section, lime oven, warehouses, workshops, etc., should be completed by 1963. The factory should be able to process 14,000 quintals of sugar beet per 24 hr.

Russian aid to Ceylon

Russia has offered to set up a wheat flour mill as part of her economic aid to Ceylon. It will be the first in the island and will be capable of milling 100,000 tons of flour a year. The cost is 20 million rupees.

The Food Ministry of Ceylon believe that it will be the largest in South-East Asia.

A.M.I.F. chairman

The president of the Rath Packing Company of Waterloo, Iowa, Mr. A. D. Donnell, has been named chairman of the board of directors of the American Meat Institute Foundation, internationally known research institution at the University of Chicago.

Mr. Donnell succeeds H. Harold Meyer, president of the H. H. Meyer Packing Co. of Cincinnati, Ohio, who retired from the Foundation board after having served successively as its treasurer and vice chairman and chairman of its board. Mr. Donnell was vice chairman of the Foundation board during the last year and is succeeded in that position by James D. Cooney, president of Wilson and Co., Inc., Chicago.

Hungarian beet-sugar production plant

Introduction of a new-type diffusion plant in Hungary's sugar-beet industry is said to have proved a success, and the Láng Machine Factory is now making five more installations for home use and export.

The first of the so-called "J"-type diffusion plants, which extract the sugar from beet slices in a continuous process instead of by stages as has been the process so far, was installed last year at Petóháza. This method of sugar extraction is said to have been devised by workers and technicians of the Hungarian Sugar Research Institute. It is one-man operated and produces 700 tons of sugar daily with sugar loss reduced to 0·2%—stated to be half the amount of loss incurred in the normal method.

Colombian flour mill

A company has been formed in Colombia for the installation of a flour mill in the Barranquilla region at the cost of Ps. 1½ million.

Thai bran oil plant

The Thailand Commercial Co-operatives Department has made plans for setting up a plant to extract bran oil. Cost is estimated at Baht 6 million (approx. £100,000). It is planned to send officials to Rangoon to study the operation of modern plant there.

Dominican banana plant

The plantations and the new banana puree plant of the Granada Fruit Company, Puerto Libertador, Dominican Republic were visited recently by the British Ambassador to the Republic, Mr. W. McVittie. The plant produced 750,000 gal. of puree in 1½ gal. cans during 1958. Mr. McVittie also saw the loading of banana stems at the port, each wrapped in pliofilm bags manufactured in the Republic, to prevent bruising.

Argentine flavours factory

A new works of Naarden Argentina was opened in Buenos Aires recently. The opening ceremony was performed by Dr. W. A. van Dorp, the head of the Naarden parent company in the Netherlands. Among others present were the Argentine Minister of Industry, the Dutch Ambassador and several hundreds of leading bankers and industrialists. The Naarden subsidiary in the Argentine was founded in 1946, since when, under its managing director Mr. J. Harms, it has become an important distribution centre for the firm's products to serve Argentina.

The new building houses offices, a laboratory, production plants for flavourings, perfume compounds, etc., and a store house. There has been a marked expansion of trade between the Netherlands and the Argentine, especially since the war. Holland spends about 250 million guilders on Argentinian goods and services every year. In return the Argentine buys 150 million guilders worth of Dutch goods and services per annum. The second most important feature in the volume of goods Holland sells to the Argentine is made up of chemical and pharmaceutical products—the value of which is equalled by that of the export trade in Dutch built ships and other capital goods.

Trade Marks

RILCHOC. — 776,382. Non-medicated chocolate confectionery. **C. W. Carter and Co., Ltd.**, 84, Brook Street, London, W.1.

HOT DON.—776,431. Rice, tapioca, sago, flour, bread, pastry and condiments; cereal preparations for food for human consumption; and preparations included in Class 30 made from all these goods; and flour confectionery. **Donnelly Dublin, Ltd.**, 35-38, Cork Street, Dublin, Eire.

BASSETT'S.—777,926. Non-medicated sugar confectionery; non-medicated liquorice confectionery and chocolates. **Geo. Bassett and Co., Ltd.**, Beulah Road, Owlerton, Sheffield, 6.

CHAMP.—777,946. Chewing gum. **Chix Confectionery Co., Ltd.**, 15d, Argyll Avenue, Trading Estate, Slough, Bucks.

ESPRESSO.—778,016. Cakes and pastries. **Northern Dairies, Ltd.**, 287, Beverley Road, Hull.

QUAKER HONEY MUNCH.—775,998. Cereal preparations made with honey for food for human consumption, but not including bread, biscuits, cakes, pastry or confectionery. **Quaker Oats, Ltd.**, Bridge Road, Southall, Middlesex.

MUNCHIES.—B761,521. Potato crisps for sale in Northern Ireland. **The Ulster Iced Drinks Co., Ltd.**, 10, Rumford Street, Belfast, Northern Ireland.

PORKOLET.—778,474. Pork meat products for food. **W. L. Miller and Sons, Ltd.**, Sterte Avenue, Poole, Dorset.

GOLDEN FESTIVAL PICSNAKS.—B780,017. Tinned fish, bottled fish, fish pastes, canned meats and meat pastes. **Willharts, Ltd.**, 27, The Headrow, Leeds.

CAPTAIN WILL'S PICSNAKS. B780,018. Canned meats and fish pastes. **Willharts, Ltd.**, 27, The Headrow, Leeds.

QUIP.—781,449. Dried vegetables. **J. Bibby and Sons, Ltd.**, 21, King Edward Street, Liverpool.

GOLDEN CROWN.—778,228. All goods included in Class 30, but not including flour, sugar confectionery, chocolate or chocolates, or any goods of the same description as flour, sugar confectionery, chocolate or chocolates. **H. & C. (Retail), Ltd.**, 179-189, City Road, London, E.C.1.

HORLICK.—B778,247, and **HORLICKS.**—B778,248. Biscuits (other than biscuits for animals), sweetmeats; and chocolate. **Horlicks, Ltd.**, Stoke Poges Lane, Slough, Bucks.

PRINCESS SNOW WHITE.—779,277. Marshmallows, being non-medicated confectionery, none being for use in the making of marshmallow biscuits. **H. W. Stewart, Ltd.**, Riverford Confectionery Works, 84, Riverford Road, Pollokshaws, Glasgow, S.3.

FISHERMENS.—779,358. Boiled sugar confectionery and panned sugar confectionery, none of them being medicated. **Clyde Confections, Ltd.**, Watt Road, North Hillington, Glasgow, S.W.2.

SWEEP.—779,392. All goods included in Class 30. **Sooty Concessions, Ltd.**, 121, Queen Victoria Street, London, E.C.4.

MAHATMA.—780,543. Rice, tapioca, sago, flour; and preparations made from cereals, being foods for human consumption. **Louisiana State Rice Milling Co., Inc.**, Abbeville, Parish of Vermilion, Louisiana, U.S.A.

SUN.—777,800. Potato crisps. **J. Lyons and Co., Ltd.**, Cadby Hall, London, W.14.

All books reviewed in FOOD MANUFACTURE as well as any other scientific or technical book may be obtained from:

Technical Books
308, Euston Road
London, N.W.1.
Tel: Euston 5911.

Prompt attention is given to all orders.

SCRUMPETS.—780,396. Sugar confectionery and chocolate confectionery, none being medicated; and chocolate and chocolates. **Yeatman and Co., Ltd.**, Cherry Tree Works, Watford, Herts.

BIRL. — 780,800. Chocolate-coated marshmallow biscuits. **Wm. MacDonald and Sons (Biscuits) Ltd.**, Glengarry Biscuit Works, Hillington, Glasgow, S.W.2.

CALTOP.—778,631. Meat; fish, poultry, and game, none being live; meat extracts; jellies (for food), jams, eggs, milk, dairy products (for food); edible oils, edible fats; fruit preserves, vegetable preserves; and pickles. **A. Thomas Webb, Ltd.**, Candlewick House, 116-126, Cannon Street, London, E.C.4.

Technical Press Review

February

Manufacturing Chemist.—Special Issue: Fire Prevention; the African Species of Rauwolfia; Analysis of M.C.P.A.—Weed-Killer; Purine Analogues in Cancer Therapy; Non-Irritant Depilatory; Progress Reports: Pest Control Chemicals; Disinfectants and Disinfectation.

Dairy Engineering.—Special Issue: Instrumentation; Instrument Control for Dairy Automation; Instrumentation for Automatic In-Place Cleaning; Instruments for the Dairy Industry—A Guide and Survey; Processed Milk and Milk Products for the South Pacific; Transport of Milk by Road—3.

World Crops. — Special Issue: Weed Control, Weed Control in Temperate Regions; Weed Control in the Tropics; Potato Blight; Protection Against Termites; Aerial Spraying.

Chemical and Process Engineering.—Review of Mixing Machinery; Can Calcium Carbide Be Made in New Zealand?; Analogue Computers in Chemical Engineering.

Automation Progress. — Process Control by Computer; Data Sampling—Theory and Practice; Tape Control for Measurement and Machining—2; Hydraulic Valves for Aero Engine Test Plant; Cost Accounting in Conditions of Automation; German Control Engineering Activities; Automatic Control of Effluent Neutralisation.

New Companies

Ernst S. Braunschweig, Ltd. (616115.) 58, Francklyn Gardens, Edgware, Middlesex. Buyers, sellers, importers, exporters, dlrs. in and mnfrs. of fresh and dried fruits, vegetables, etc. £100. Dirs.: Ernst S. and Mrs. Nelly Braunschweig.

A. W. Cleave and Son, Ltd. (615319.) 32, Rainsford Road, Chelmsford, Essex. Biscuit mnfrs., bakers, confectioners, etc. £1,000. Dirs.: A. W. and K. A. Cleave.

J. Duffy and Co., Ltd. (615347.) 14, Wentworth Grove, Huyton-with-Robey, Lancs. To carry on the business of mnfrs. and dlrs. in edible and technical oils, etc. £2,000. Subs.: J. Duffy and Jack B. Rowlands.

Gillingham Dairies (1958), Ltd. (614312.) Newbury, Gillingham, Dorset. £5,000. Dirs.: C. W. R. Francis, W. P. and N. A. Coward.

Icecold Foods and Refrigeration, Ltd. (615014.) 31, Wallasey Road, Wallasey, Ches. £100. Dirs.: John A. and Nellie C. A. McGibbon.

Milk Powder Nominees, Ltd. (615840.) To subscribe and become a member of any organisation of mnfrs. marketing milk powder in the U.K. and Ireland, which shall have as its principal object the promotion and expansion of the demand for milk powder in all its forms by means of advertising and general publicity, etc. Company limited by guarantee without share capital. Subs.: Wilts. United Dairies, Ltd., 31, St. Petersburg Place, London, W.2; United Creameries, Ltd.; Dried Milk Products, Ltd.; Ambrosia, Ltd.; Express Dairy Co. (London), Ltd.; and the Nestlé Co., Ltd.

Miller's Mushrooms, Ltd. (616376) £5,000. Dirs.: P. and Mrs. S. A. Zivkovic, The Barn, Littlewick Green, nr. Maidenhead.

Mister Okey Pokey, Ltd. (613858.) 26-30, County Chambers, Weston Road, Southend-on-Sea. Mnfrs.and dlrs. in ice cream from mobile vehicles and caterers generally. £5,000. Dirs.: Ernest Pacitto and F. A. Burden.

Murton Soft Drinks, Ltd. (613913.) To carry on the business of mnfrs. of and dlrs. in mineral and aerated waters, etc. £1,000. Dirs.: J. Hewitt, W. Stancliffe and Doris M. Stancliffe. Subs.: K. W. H. Bloor, Raddon House, Gate Fulford, York, and William Stancliffe.

A. R. Parkin, Ltd. (614315.) 245, Birmingham Road, Dudley, Worcs. To carry on the business of brewers, distillers and mnfrs. of and dlrs. in canned goods, vinegar, wines, spirits, porter, aerated waters, pickles, sauces, etc. £3,500. Dirs.: Albert R. and Mrs. Mary S. Parkin.

Purafoods (London), Ltd. (614774.) Barclays Bank Chambers, Finsbury, London, N.4. To carry on the business of mnfrs. of and dlrs. in emulsifiers for sausages and mnfrd. meat pies, etc. £100. Dir.: Stanley E. Clarke, 39, Duckett Road, London, N.4.

Wood Gro, Ltd. (616310.) The Broadway, Crouch End, London, N.8. To carry on the business of sugar buyers, sellers, mnfrs., refiners, etc. £100. Dirs.: K. W. Godwin, Wm. Lawson and H. A. F. Billham.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

807,067. UNILEVER, LTD.: Manufacture of shortening.

807,084. KONJNKLIJKE PELLERIJ MERCURIUS VORHEEM GEB. LAAN. N.V.: Method of preparing quick-cooking and non-glutinous cereals.

807,070. CORN PRODUCTS REFINING CO.: Process for preparing starch products and the resulting product.

806,992. J. C. C. DYEKJAER: Method of packaging foodstuffs.

807,254. EKCO PRODUCTS, LTD.: Package for article of food.

807,858. HORNER AND CO., LTD., and A. CAMERON: Manufacture of toffee.

807,881. SWIFT AND CO.: Manufacture of cheese slabs or the like.

807,863. T. WALL AND SONS, LTD.: Manufacture of food products.

807,865. EASTMAN KODAK CO.: Process for colouring and fortifying food consisting of or containing fatty materials.

807,730. NATIONAL DAIRY PRODUCTS CORPORATION: Manufacture of cheese.

ABSTRACTS OF BRITISH PATENTS

Chocolate couvertures

In making chocolate couvertures for the confectionery and bakery trades, it has been customary to incorporate all the ingredients, viz. cocoa, fat, sugar, and an emulsifying agent, e.g. lecithin. It is claimed quicker melting and a higher gloss of the finished product are obtained if part of the fat is omitted from the basic mixture and added subsequently in the form of powder or granules. The latter are obtained by passing the melted fat, containing the emulsifying agent, if not already present in the basic mixture, over chilled rollers, from which it can be removed by scraping with a knife.

The basic mixture and the free fat powder withheld therefrom are finally mixed in a machine, with avoidance of high pressures. It is also necessary to avoid such generation of heat by friction as would cause melting of the free fat granules.—805,353. *Wm. Stewart and Arnold, Ltd.*

Bakers' yeast

The purpose of the invention is to simplify the production of bakers' yeast by eliminating one or more of the washings in separators as generally practised. Yeast concentrate is dehydrated on a continuous filter to form a cake which is washed in one or more stages on the filter, the washing water being removed through the filter.

In the single example of the specification, yeast suspension was taken from a fermenting vat, in which the dilution, viz. the ratio of the volume of the original concentrated molasses to that of the wort in the final stages of fermentation was 1:15, the water content being about 98-98·5%. The suspension was concentrated in separators to about 84% water content without washing. It was then supplied to the continuous filter surface of a cylindrical drum vacuum filter, of 2 metres diameter and rotating at 3·3 revolutions per min. The speed of the filter surface was 21 metres per min. The yeast on the filter was dehydrated to about 73% water content. Washing of the yeast with water was effected on about a quarter of the periphery of the filter surface. The quantity of water used was from 750 to 1,000 litres per hour and the washing time from about 5 to 10 seconds. The yeast was then dehydrated on the same filter to a water content of 73%.

Among other advantages claimed for the process is excellent colour of the yeast produced. — 804,426. *Svenska dastfabriksaktiebolaget (Sweden).*

Improvement and bleaching of bread

Gaseous improvers, such as nitrogen trichloride or chlorine dioxide, bring about oxidation of fats in flour. It has been found that if the oxidised fats are kept dissolved in a suitable organic solvent for a sufficiently long time, a change takes place, resulting in the formation of substances which improve the baking quality of untreated flour.

The invention consists of extracting fat from flour, oxidising it before or after extraction, retaining it in contact with a solvent, while exposed to light, until the desired characteristics have developed in the solvent and/or any precipitate formed, and finally removing the solute and/or precipitate from the solvent. Methods of testing the solution from time to time during storage are described. In baking tests the sample of the solution is mixed with a small quantity of flour, which is mixed with the main portion after the solvent has evaporated at room temperature.

After the oxidised fat has been stored in solution for a few days, a polymeric precipitate forms. Both this original material and the solution remaining after precipitation may be separated into fractions of differing activity in bread improvement by various methods, such as adsorption chromatography using activated alumina. The precipitate itself may also be fractionated, e.g. by solvent extraction and partition.

Fat extracted from untreated flour may also be treated, but the process is very slow. It can, however, be accelerated if carbon tetrachloride is the extractant or if fat previously extracted by another solvent is dissolved in carbon tetrachloride. Other solvents mentioned are petroleum ether, chloroform, and ethyl ether.—804,914. *The Research Association of British Flour-Millers.*

Fermented meat products

The invention relates to meat products ready for the table; particularly fermented sausages. The inoculum consists of a pure culture of *Pediococcus cerevisiæ*, or one of the closely related varieties enumerated. Salt-tolerant strains of the micro-organisms are used, having a tolerance within the range of 5% to 8%. Bacteriological details of the culture preparation are given. A "1% inoculum" is recommended, this being the cell crop from 1 pint of medium to 100 lb. of sausage.

In an example, the composition of the sausage material is 33·3% trimmed bull rounds, 33·3% trimmed cow rounds, 28·5% pork belly trimmings, 0·41% black pepper, 0·05% ground nutmeg, 0·12% ground coriander, 1·4% dextrose, 2·9% sodium chloride, and 0·02% sodium nitrite. The beef and pork belly trimmings are ground or cut separately to achieve the desired degree of fineness. Thereafter both are put together in a mixer, where the spices, dextrose, and sodium chloride are added dry, as may be the sodium nitrite, but the latter is preferred to be dissolved in a minimum amount of water before adding. While the ingredients are being mixed, a 1% inoculum is added by sprinkling or spraying the aqueous suspension of *Pediococcus cerevisiæ* on to the material. The meat is packaged and placed in the smokehouse, for which the treatment schedules of time, temperature, and humidity are given. In the smokehouse the bacteria grow and develop very rapidly, the cells producing much lactic acid. The *p*H reaches a value of about 5. The product is finally removed from the smokehouse and stored.—804,296. *A. W. Brickman, V. Conquest, F. J. Madden, W. B. Oleson, and E. T. Filbey (all of U.S.A.).*

Cake mixes

Cake mixes containing shortening have as main ingredients flour, sugar, and shortening, with the addition of baking powder, dry milk solids, salt, flavouring, dried eggs, and the like. In common with home-made mixtures of the same ingredients, the preparation of batters is physically arduous, on account of the low proportion of liquid to solids in the early part of multi-stage mixing. The single and multi-stage methods of working are surveyed, the former being considered to give cakes of inferior quality.

In the present invention, which is claimed to facilitate batter preparation and improve the quality of the cake, there is added to the mix a small proportion of a hydrophilic colloid, which is carboxymethyl cellulose or a water soluble salt thereof. The sodium salt is preferred. It has a viscosity of about 1,200-2,000 centipoises in 1% aqueous solution. It is used to the extent of 0·01% to 1·0% of the total solids. In an example, the cake mix consists of 37·28% cake flour, 44·72% confectioners' sugar, 13·0% emulsified shortening, 2·50% dry skim milk, 0·70% sodium chloride, 0·60% sodium bicarbonate, 1·00% sodium acid pyrophosphate, and 0·20% sodium carboxymethyl cellulose. The product is a free-flowing powder.—803,758. *General Foods Corporation, U.S.A.*

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Number 6 February 1959

The Borneo Illipe Nut (Shorea)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

Copies of this Bulletin, together with a folder, are available on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

The Illipe Nut is mainly found in Borneo and Sumatra, and is derived from certain species of Shorea which belong to the family of Dipterocarpaceae—big forest trees producing timber known as meranti or seraya. The fruits of these trees have five wings and are egg-shaped with a thin wooden shell encasing a four segment kernel. The nature of the fruit can be seen in the accompanying drawing. There are nearly 100 different species of Shorea in Borneo alone, but the size of the fruit varies considerably and only a few are, therefore, considered to be of commercial value. The most predominant of these is the Shorea gysbertsiana, which is found growing mainly on well drained alluvial soil close to rivers and jungle streams and produces the bulk of the nuts known in the trade as " large black " and " large brown "—the emphasis being on size. The trees are in bloom just before the onset of the North-East monsoon and if, as often happens, the break of the monsoon occurs early and with very heavy storms of wind and rain the blossom and immature seeds are stripped from the trees and the crop is not worth collecting. This set of circumstances occurs so frequently that it has given rise to the belief that the trees only fruit once in five years.

Illipe Nuts are essentially a wild crop and there is little cultivation by the local inhabitants. When the fruits are ripe they fall from the trees and are collected by the natives, who may well be in the jungle for weeks on end. If not collected promptly the nuts either germinate near the mother tree or are very quickly attacked by jungle insects. During the heavy rains, the fallen nuts may be carried down-stream on flood-water and deposited elsewhere in the riparian fringe. After collection, the wings are removed and the nuts dried over open fires, or decorticated and left out on mats in the sun When they are dry, the kernels are exported under names denoting size, colour and origin, e.g. " Large Brown Sarawak "

ILLIPE BUTTER

Illipe Butter, also known as Borneo Tallow, has been referred to commercially as Green Butter, a term often applied to a small group of solid fats which bear a physical resemblance to Cocoa Butter.

Unlike Cocoa Butter, Illipe Butter cannot be used in the crude state but must be refined; the refined butter varies in colour from cream to light green, has a complete melting point of approximately 38°C. and possesses good stability.

Illipe Butter closely resembles Cocoa Butter both chemically and physically, but differs from the well known solid fats of the Lauric Acid group, e.g. Coconut Oil and Palm Kernel Oil, in that it is harder and more brittle but at the same time melts over a narrower temperature range; it does not contain glycerides with fatty acids of low molecular weight. Like Cocoa Butter it has a fairly simple fatty acid and glyceride composition.

The similarity in properties between Cocoa Butter and Illipe Butter enables the latter to be used to some extent as an alternative to or extender of Cocoa Butter itself. For normal chocolate production the higher melting point of Illipe Butter is considered to be a slight disadvantage, but it does find application in the manufacture of chocolate intended for consumption in tropical countries.

Average Fatty Acid Composition of Illipe Butter.

Palmitic Acid	21%
Stearic Acid	41%
Oleic Acid	38%

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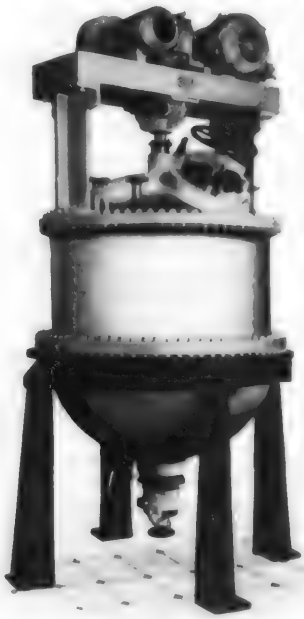

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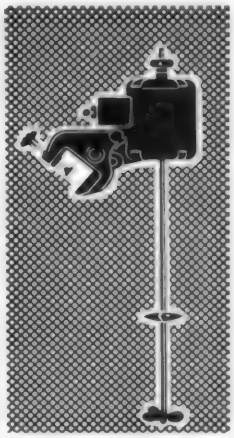
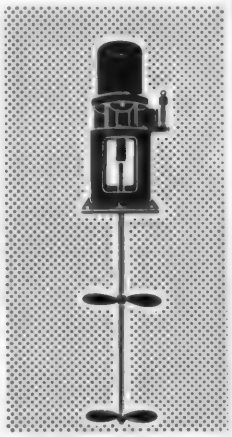


AD type 1450 r.p.m. high speed mixer.



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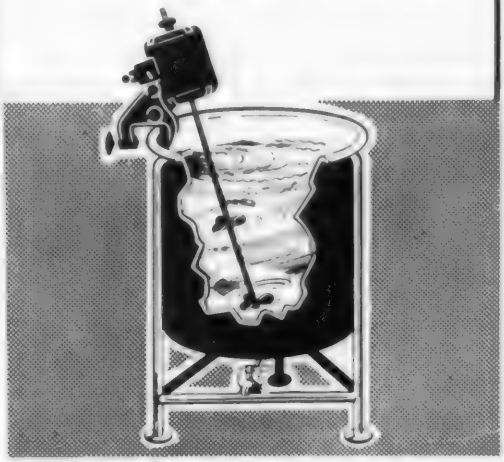

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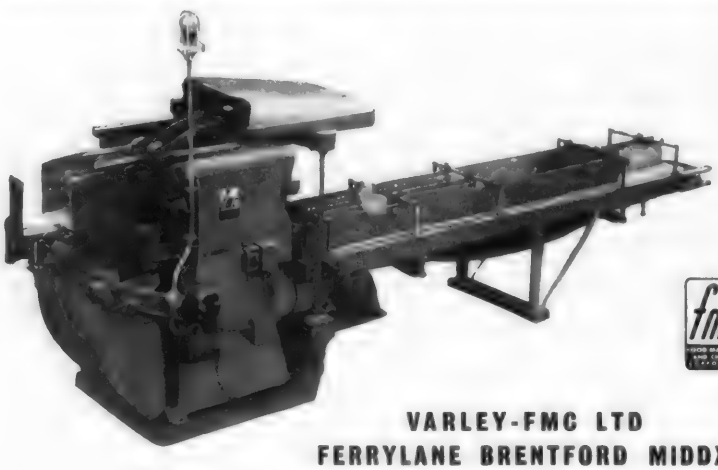

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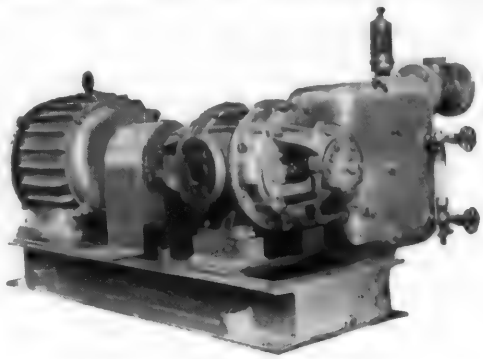

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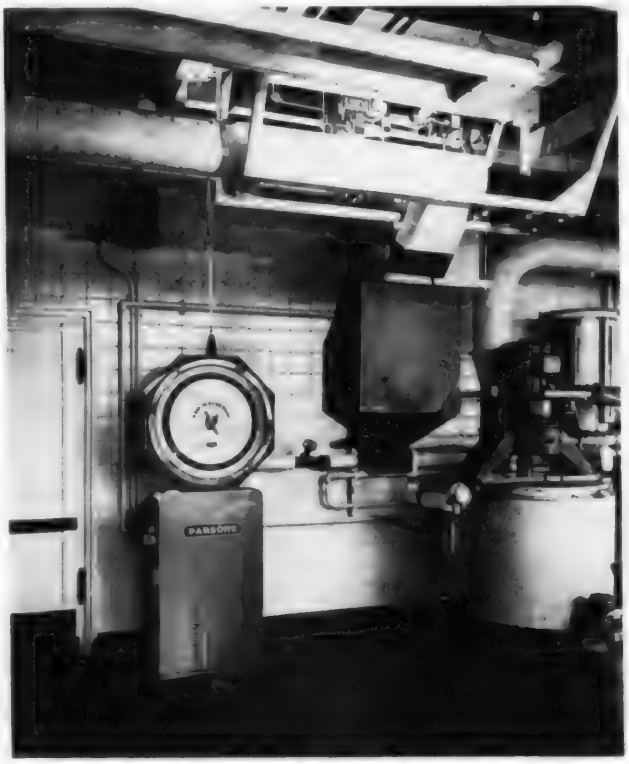

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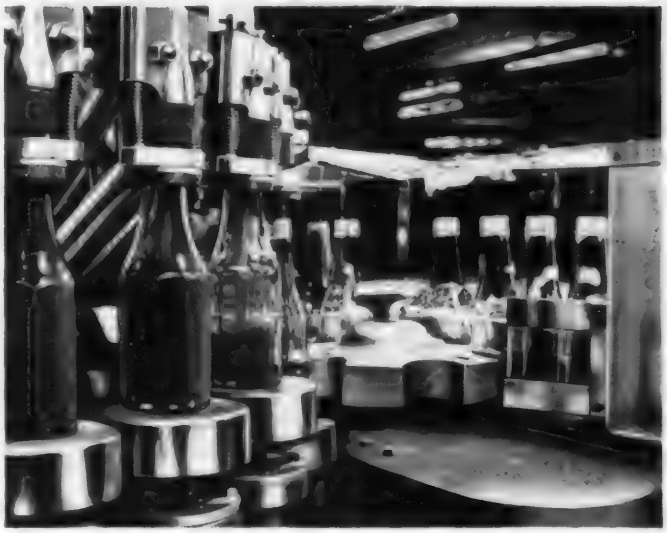

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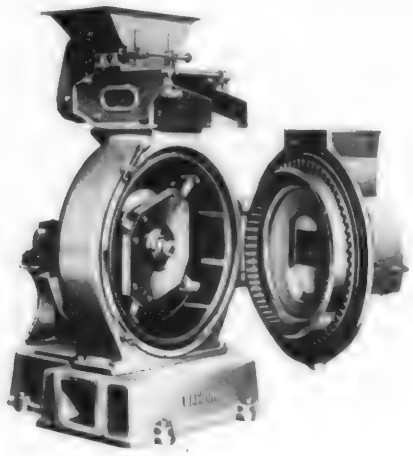

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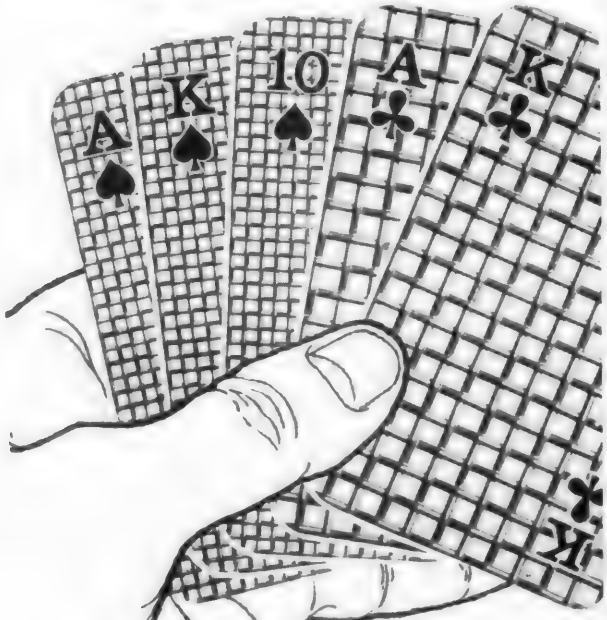

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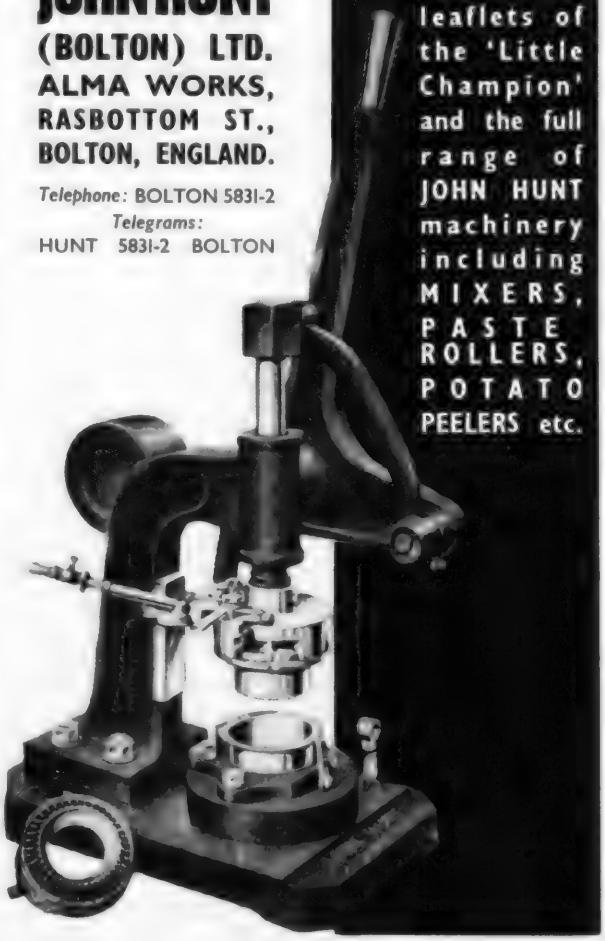

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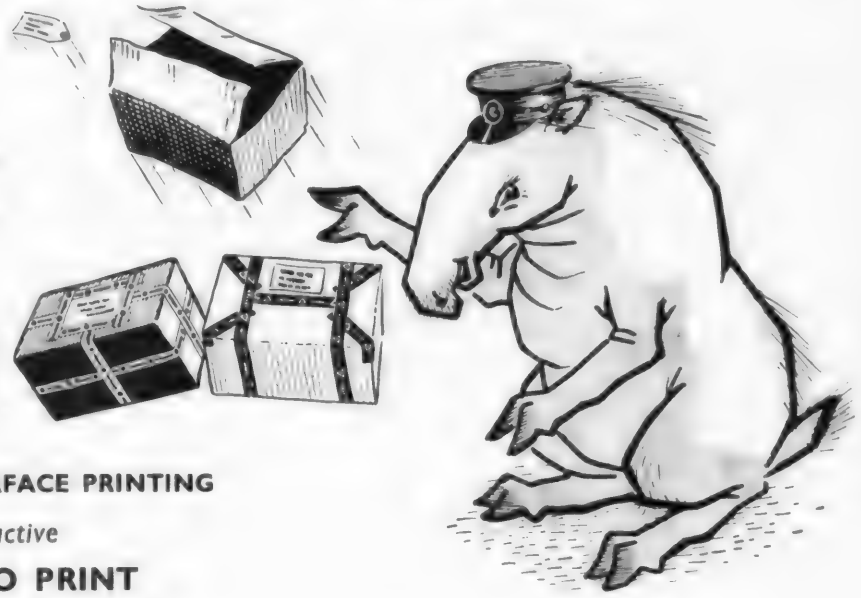

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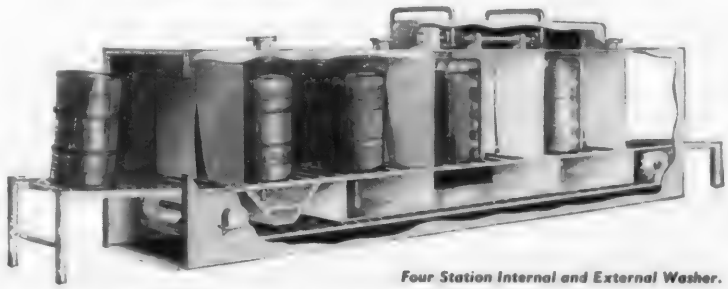

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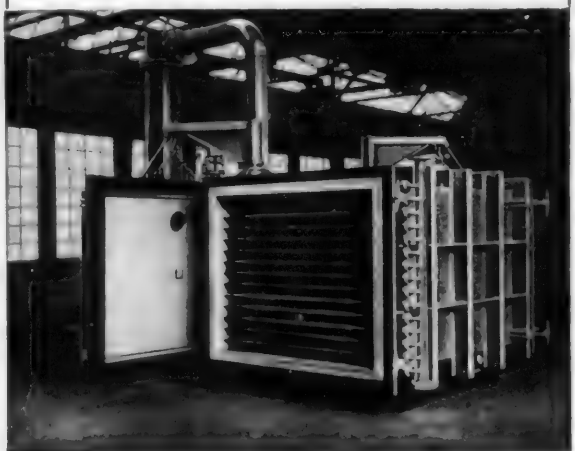

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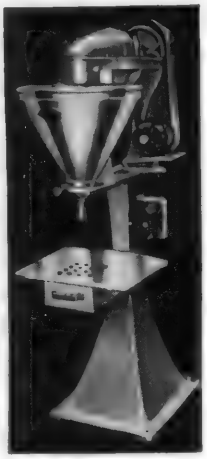

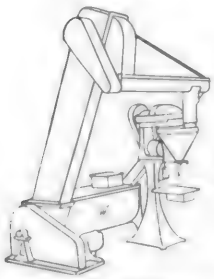

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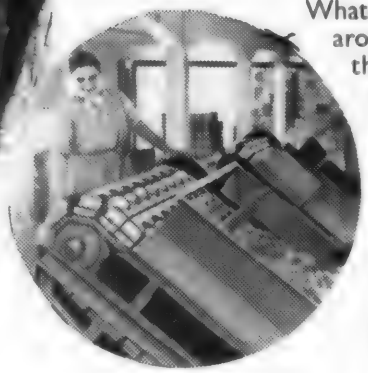

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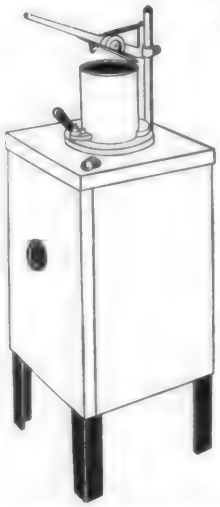

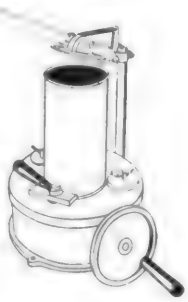

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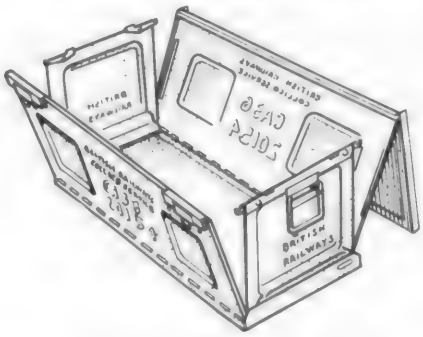

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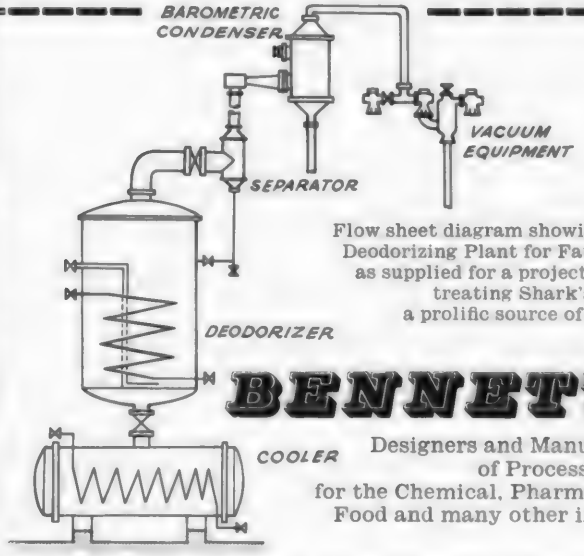

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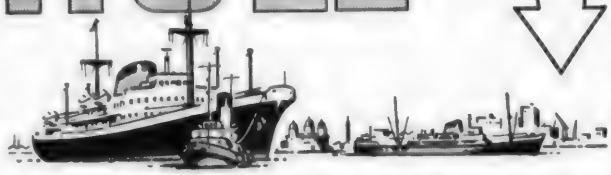

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AHP 3

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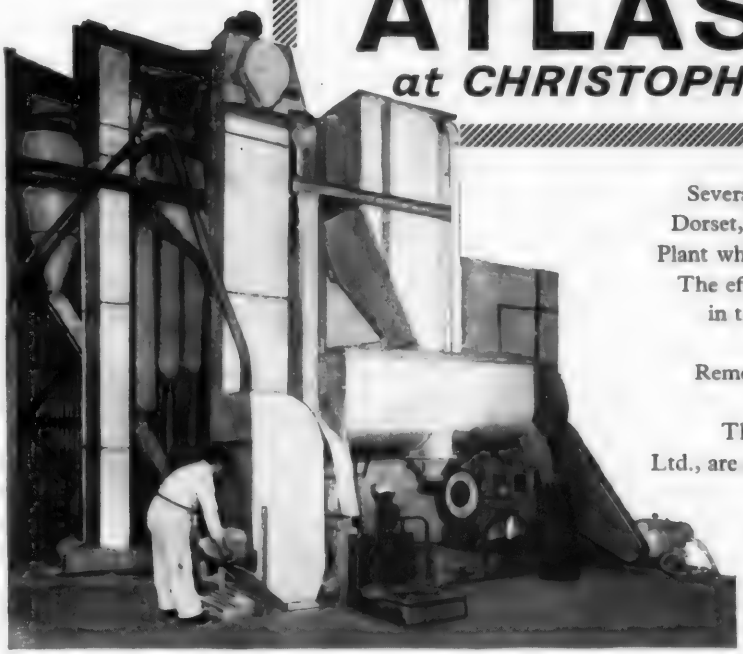

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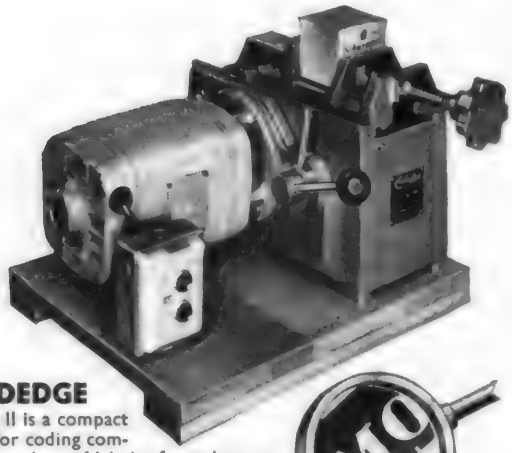

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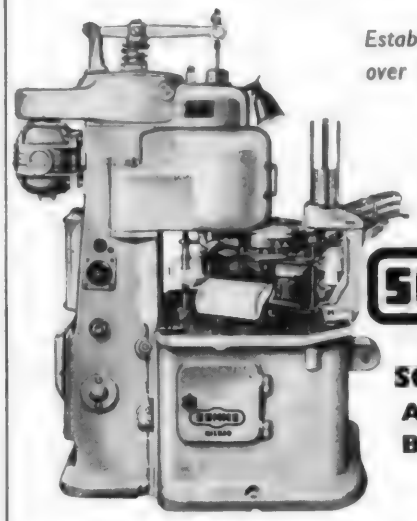

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MINISTRY of Agriculture, Fisheries and Food: Temporary appointments for four to five years for research scientists, experimental officers, assistant experimental officers and assistants (scientific) on four research projects administered under U.S.A. counterpart funds. General academic requirements: Research Scientists: first or second class honours degree in an appropriate subject together with three years relevant post-graduate experience. Experimental Officer class: General Certificate of Education in five subjects including two at advanced level (or equivalent qualification). Assistant (Scientific): General Certificate of Education in four subjects at ordinary level (or equivalent qualification).
Project (*a*) (*London*): The mechanism of the protective action of sulphur dioxide in controlling non-enzymic browning with particular reference to dehydrated vegetables. Two Research Scientists (*a*) biochemist, (*b*) physical chemist. Knowledge of chromatographic and/or radio isotope laboratory techniques an advantage. One Experimental Officer: Degree in chemistry or equivalent desirable. Knowledge of food processing an advantage.
Project (*b*) (*Aberdeen*): Basic investigation of the biochemistry and biophysics of the dehydration of meat fibres by the "accelerated freeze-drying" process. Two Research Scientists: (*a*) biochemist, (*b*) biophysicist. Previous experience derived from studies involving migration of water and ions in biological systems an advantage. One Assistant Experimental Officer or Assistant (Scientific): preferably with some biochemical background.
Project (*c*) (*Aberdeen*): Synthesis and testing of natural polyphenolic compounds as antioxidants. Two Research Scientists: (*a*) organic chemist preferably with experience in field of phenolic compounds, (*b*) physical chemist with experience in reaction kinetics particularly free radical reactions.
Project (*d*) (*Aberdeen*): Investigation of molecular changes in carotenoids and related compounds during processing and storage of foods. One Research Scientist: chemist with qualifications in physics and with an interest in infrared and ultra-violet spectroscopy, preferably with experience in these techniques. One Assistant Experimental Officer or Assistant (Scientific).
Salary ranges (men): Research Scientist £1,160–£1,370 (starting salary according to experience). A higher salary (within the range £1,410–£2,000) may be offered to candidates with exceptional qualifications and experience. Experimental Officer £945–£1,160. Assistant Experimental Officer £377 10s.–£825 (starting salary according to age and experience). Assistant (Scientific) £307 10s.–£670(starting salary according to age and experience). Additional pay for posts in London. Women's scales slightly less but reaching parity with men's scales in 1961. For Research Scientists provision for superannuation will be under the Federated Superannuation System for Universities.—Write to Ministry of Labour and National Service, Technical and Scientific Register (K), 26/28, King Street, London, S.W.1, quoting F.837/8A and indicating project and post for which application is made.

BACTERIOLOGIST required to undertake routine investigations in connection with the quality control of meat products. A salary commensurate with qualifications and experience will be paid.—Applications stating age, qualifications and experience to be addressed to the General Manager, Marsh and Baxter Ltd., Brierley Hill, Staffs. Envelopes endorsed "Laboratory".

NORTHERN Ireland. Established Representative with substantial connection in Grocery Trades (Custard Powder and Table Jellies) seeks additional non-competitive lines. Agency or Representative basis with consent of present Company with view to sharing expenses of Territory. First class opportunity to a manufacturer wishing to develop trade in populous N. Ireland areas fully covered by regular car journeys.—Principals are invited to write Box Z.Z.121, Deacon's Advertising, 36, Leadenhall Street, London, E.C.3.

SALES Manager for old established Essence House. Must know the trade and be capable of top level selling. State experience, age and salary required. Pension Scheme available.—Box B5807, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

SITUATIONS VACANT

FOOD Technologist as General Manager of Food processing plant in Salisbury, Southern Rhodesia, including dehydration of eggs, vegetables and fruit by modern American Electric Spray drier and electric cabinet driers. Salary and commission according to experience. Fairhurst, Oaklands, Curridge, Berks.

EXPERIENCED CATERING SALESMAN

required to sell a specialised consumer product within the Greater London area for a very large old-established company. The position will carry a four-figure salary and will be pensionable.—Replies to Box E.C.512, A. K. Advg., 212a, Shaftesbury Avenue, London, W.C.2, stating age and details of education and experience.

CHIEF ENGINEER

A QUALIFIED ENGINEER is required by a major food manufacturing Company with headquarters in London.

The man selected will be between the ages of 35 and 45. He will be required to serve for a short time as Deputy Chief Engineer and then to take full charge of all engineering activities of the British factories of the Company. He should be familiar with the design and adaption of special purpose machinery and know particularly about canning and food machinery.

To a man with an outstanding record of achievement we can offer an interesting post, a commencing salary in the region of £2,000 per annum, and a pension. Write in complete confidence, giving full personal details, and a summary of experience and salaries earned to Box No. 85820, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

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required by well-known and progressive Scottish Engineering Company.
Applicants should have sound basic knowledge of Food Engineering, particularly the Chocolate, Confectionery, Preserving, Processing, Canning and Packaging Industries. Preference will be given to applicants with previous consulting and sales experience capable of negotiating with customers at top level.
Appointments will be made on a progressive salary scale.
Successful applicants may be required to work either from London or from the Works.
Only applications giving fullest possible details of age, experience, qualifications and present salary will be considered.
Apply Box B5786, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

ASSISTANT Factory Manager required with first-class experience in the Fruit and Vegetable Canning Industry. Organising ability and control of labour essential. Pension Scheme. Preferably unmarried.—Apply with full details in confidence to "Works Director," Eastern Counties Preserves Ltd., Bridge Road, Long Sutton, Lincolnshire.

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SITUATIONS VACANT

FOOD MICROBIOLOGIST

Aplin and Barrett Ltd. have a vacancy in their Central Laboratories (Yeovil) for a senior Food Microbiologist. The work is of an interesting nature and involves the elucidation of food spoilage problems of considerable diversity. Candidates should have a good working knowledge of bacteriology and a sound appreciation of the chemical and physical factors involved in bacteriological stability and in food spoilage.—Apply, in confidence, to the Director, Technical Department, Aplin and Barrett Ltd., Yeovil, Somerset.

BIRDS Eye Foods Limited, a rapidly expanding Unilever company, manufacturing quick frozen foods, require an Assistant Quality Controller at their Kirkby, near Liverpool, factory. He will assist the Quality Controller in his responsibility for the inspection and grading of raw materials, packing materials and finished products and will generally assist in the management of the Quality Control Department. The Assistant Quality Controller will be required to work on shifts, assuming full responsibility for the quality control function. Great importance is attached to quality and this is a responsible post. General conditions of employment and prospects for the right man are very good. Applications are invited from men under 35 who should have at least Inter B.Sc. or a diploma in food technology.—Application forms and further details are available from Personnel Department (AV/3) Birds Eye Foods Limited, Kirkby Industrial Estate, Near Liverpool.

CHIEF Chemist. The Directors of the Co-operative Wholesale Society Limited invite applications for the position of Chief Chemist at their Sugar Confectionery and Table Jelly Works, Stockport. The successful candidate will be responsible for raw materials, quality control, and development. Applicants should have wide experience in a similar capacity and must possess B.Sc., or A.R.I.C. qualifications. Experience in sugar confectionery would be an advantage. An excellent salary is offered, commensurate with the responsibilities of the position. Excellent conditions, including a contributory superannuation scheme embracing widows and death benefits. At present there is a laboratory staff of five, in addition to the Chief Chemist.—Applications in writing, giving full details of age, education, qualifications, experience and salary required should be addressed to the C.W.S. Limited, Central Labour Department, 1, Balloon Street, Manchester, 4, endorsed "Chief Chemist, Confectionery Works," to be received not later than 10th February, 1959.

SALES Manager (Mixers) required by small, old established, rapidly expanding firm manufacturing "Z" Blade, "U" Trough and other types of Mixing Machines. Unique opportunity for the right man, with a considerable future ahead.—Write, in confidence, Frank Winkworth, Winkworth Machinery Ltd., 65, High Street, Staines.

CHEMIST required for establishment and development of laboratory. Experience in food industry of quality control. Bacteriology and research desirable but not essential. Ample scope for advancement.—Applications should be supported by career details, etc., and submitted to W. P. Appleyard, Ross Group Ltd., South Quay, Grimsby.

SITUATIONS WANTED

POSITION of Development/Production Engineer required in Food Factory by Chief Draughtsman. Proficient in modern factory requirements. Experienced in Production Layouts, Buildings, Structures, Services, Electro-mechanical Design. Responsible, reliable, inventive initiative. School Cert., O.N.C., age 37.—Box B5811, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

SITUATIONS VACANT

THE University of Leeds. Applications are invited for Imperial Chemical Industries Limited Research Fellowships in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemotherapy, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Chemistry of High Polymers [keratin and man-made fibres], Textile Technology and Textile Engineering). The Fellowships will be of an annual value within the range of £700–£1,000 a year according to qualifications and experience and will normally be tenable for three years. Further particulars can be obtained on request. Three copies of applications (one in the case of applicants from overseas), together with the names of two referees, should reach the Registrar, The University, Leeds, 2, not later than 7th March, 1959.

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THE proprietor of British Patents Nos. 710001, 763299 and 774547 is prepared to license British manufacturers to work thereunder. They relate to *Improved Process for Treating Lard*, *Improvements in or relating to Lard Shortening Products* and *Improvements in or relating to the Production of Molecularly Modified Lard* respectively.—Address: Boult, Wade and Tennant, 112, Hatton Garden, London, E.C.1.

THE proprietor of United Kingdom Patent No. 714,065 which relates to *A Purifying Centrifuge for the Separation of Bacteria and Microscopic Particles from Viscous Liquids and Emulsions*, is desirous of entering into negotiation with parties who may be interested with a view to the grant of a licence to work the invention in this country or for the sale of the Patent outright.—Communications in the first instance should be addressed to G. F. Redfern and Company, Redfern House, Dominion Street, London, E.C.2.

THE proprietor of British Patent No. 717953, entitled *Apparatus for Treating Food Products*, offers same for license or otherwise to ensure practical working in Great Britain.—Inquiries to Singer, Stern and Carlberg, 14 E. Jackson Blvd., Chicago 4, Illinois, U.S.A.

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FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty-five years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for Leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

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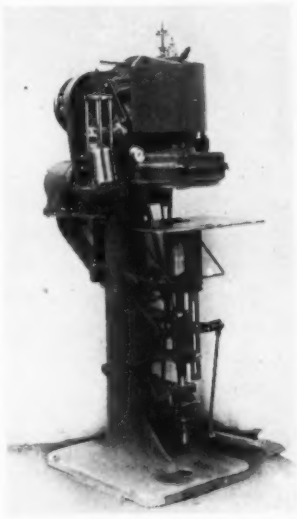

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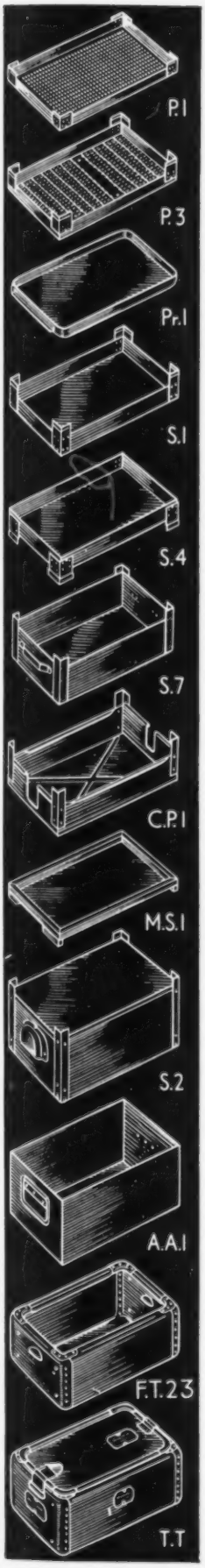

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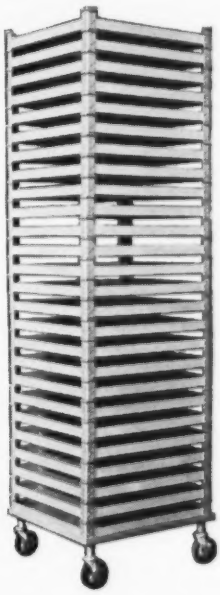

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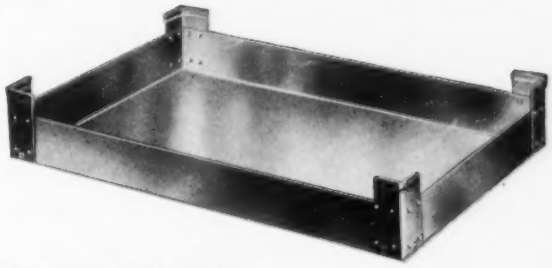

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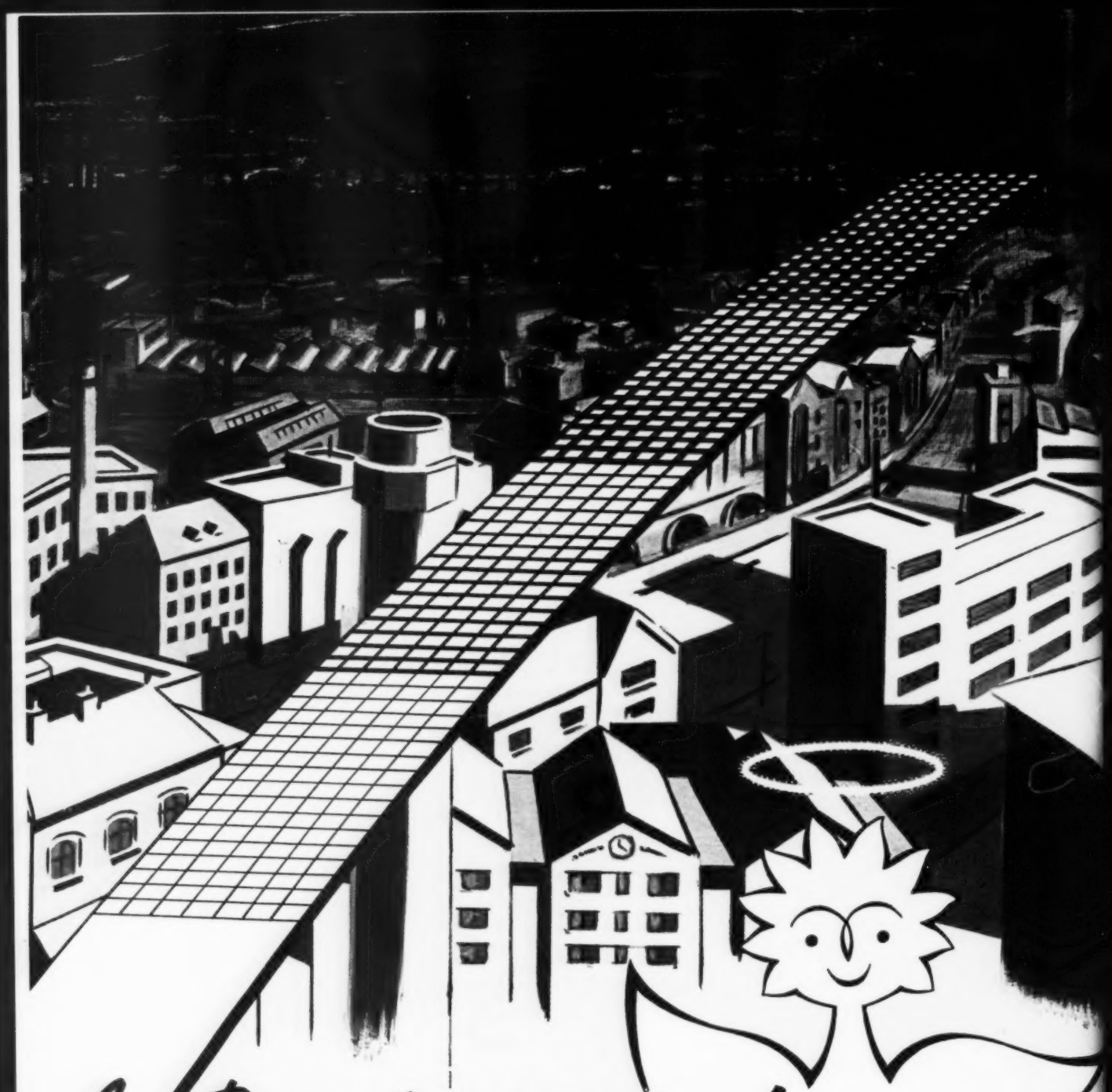

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